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THE JOURNAL  
OF  
Educational Psychology

INCLUDING EXPERIMENTAL PEDAGOGY, CHILD PHYSIOLOGY AND  
HYGIENE, AND EDUCATIONAL STATISTICS

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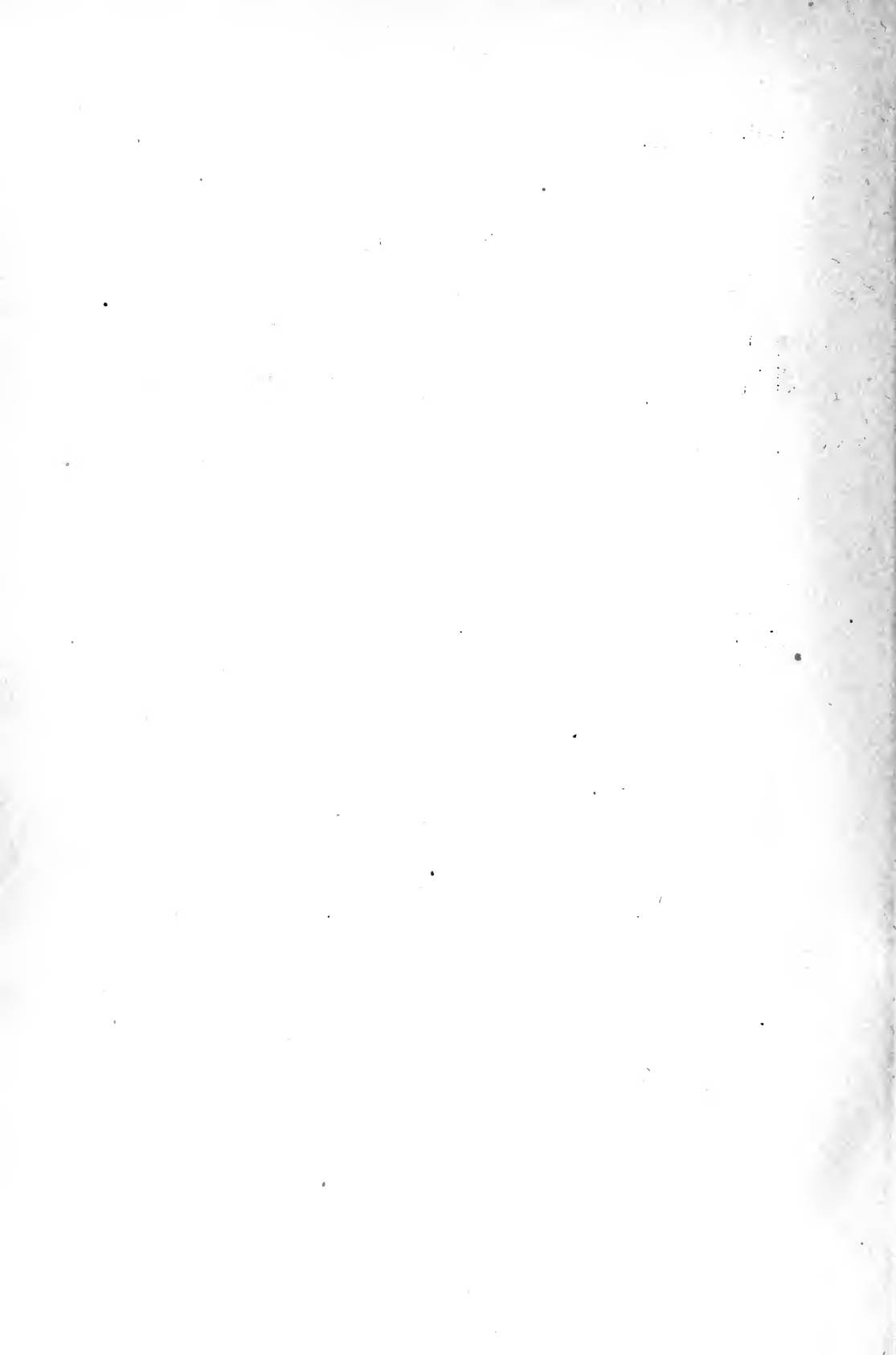
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## EDITORIAL ANNOUNCEMENT.

The editors of *THE JOURNAL OF EDUCATIONAL PSYCHOLOGY* desire to express their appreciation of the interest manifested by psychologists and educators in their undertaking and of the cordial support they have received from the educational public. While we have become conscious of the difficulties inherent in the establishment of a new educational publication, we feel, nevertheless, that the past year has been distinctly successful, and we look forward with confidence to a still wider sphere of usefulness.

For the coming year a number of special features are planned which are certain greatly to enhance the value of *THE JOURNAL* for practical educators. Chief among these features will be an active campaign for the encouragement of investigations in *EXPERIMENTAL PEDAGOGY*. At the close of his article in the December number, Inspector W. H. Winch says: "I am strongly convinced that, without active co-operation on the part of the teacher, experimental pedagogy will remain an academic study, with little effect upon the practice of the schools." The editors of *THE JOURNAL* are making a systematic effort to enlist the co-operation of adequately trained teachers in the experimental investigation of school problems. To encourage and to facilitate this pedagogical investigation each elementary and high-school subject will be surveyed by a specialist, who will point out a number of the problems which might be profitably studied by experiment under actual school conditions, and who will indicate the methods of attack which give promise of the greatest success. Several of the most eminent educators in the country have already signified their willingness to undertake the surveys. As fast as their articles are published, superintendents, principals and teachers will be encouraged to carry out the investigations suggested. In a few years these researches will undoubtedly yield a body of fact which will be of tremendous significance for school practice.

A second special feature will consist of a number of articles upon a problem that is attracting particular attention at the present time—that of *FORMAL DISCIPLINE*, or the *TRANSFER OF TRAINING*. President Lowell of Harvard, it will be remembered, recently referred to this as the most interesting and vital topic now before the educational world. We have already published a number of articles dealing with the subject, notably Professor Whipple's paper on "Visual Attention," and Inspector Winch's on "Accuracy in Arithmetic." In the current number Mr. W. S. Foster presents a study of formal

training in visualizing, while in the February number Mr. J. C. Brown will describe an interesting and practical investigation of the value of drill in arithmetic. Prof. S. S. Colvin, whose admirable account of the present status of formal discipline has met with such general favor, has also promised an article on the subject in the near future.

Other topics of current interest which will receive special consideration in our columns are sex hygiene, mental fatigue, the application of clinical psychology to education, and the perfection of mental tests for the diagnosis and classification of retarded and mentally defective pupils.

SEX HYGIENE offers a vital and a vexatious problem that concerns every parent and teacher. How significant sex is for mental development at large was clearly indicated in Dr. Jones' discussion of psycho-analysis in our November issue. In the year to come we shall print other noteworthy contributions to this subject.

The question of the nature, development and effects of MENTAL FATIGUE and its measurement by experimental methods is a central theme of the hygiene of instruction. We have already reviewed, in our December number, the recent literature of fatigue. In the February number Professor Thorndike will report the results of an experimental investigation, and other original articles will follow. A more extended contribution, an English translation of Offner's monograph on "Mental Fatigue," will appear shortly in our monograph series.

CLINICAL PSYCHOLOGY, MENTAL TESTS, the scientific study of RETARDATION AND DEFICIENCY will receive special notice in our columns. A general survey of this field by Dr. Wallin will appear in early numbers, and will attract attention because of his vigorous presentation of a constructive program for future work. We shall likewise print special experimental studies from several of the most important educational and clinical laboratories in the country.

In these several ways we aim to make THE JOURNAL indispensable to the practical school man and to further the cause of a genuine science of education. If you think these aims are worth while, will you not urge your friends to give THE JOURNAL their support? THE JOURNAL is conducted with no profit to the editors, but solely for the advancement of education. We need your co-operation to realize for the undertaking the success which we have been assured it richly deserves.

## MEASURING RESULTS IN EDUCATION.

GEORGE DRAYTON STRAYER,

*Teachers College, Columbia University.*

Efficiency in any line of human endeavor depends upon our ability to evaluate the results which are secured. No one would question the progress which has been made in education during the past hundred years, but one may very justly inquire concerning the efficiency of the work that has been done from the standpoint of the money which has been spent, and the effort and devotion of those who have engaged in teaching. In the mercantile pursuits it has been noted that seven out of every ten failures can be charged directly to a lack of knowledge of facts. Such investigations as we have had in education tend to prove that a like situation is to be found in this field. The failures in education, whether due to a lack of economical use of the funds available, to an inefficient system of organization, or to unintelligent practices in method are, on the whole, not to be charged to a lack of devotion on the part of those who have given their lives to the schools. Until it is possible to measure the results achieved, the facts of success or failure cannot be established.

Of course, no one would deny that real progress is made by the process of trial and success, both in the art of teaching and in the practice of administration. It is true, too, that we shall have to depend in considerable measure, upon demonstration as a means of bringing about improvement in current educational practice. It is none the less true, however, that scientific work in education will furnish the basis for the more rapid elimination of the mistakes in current practice, as well as point the way for improved organization of teaching. The science of education will, in its develop-

ment, occupy relatively the same position with reference to the art of teaching that the science of medicine occupies with respect to the art of healing. The progress which has been made during the past twenty-five years in the art of farming would never have been possible without the scientific work that has been done in agriculture.

Aside from the fact that we are only beginning to have a profession of education, many other factors have entered to delay the progress in the direction of standardizing our work by means of accurate measurement of the results achieved. One of the most comforting of the fallacies which are at times urged against the attempt to measure results, is found in the popular statement that the only criterion by which the success of school work can be measured, is found in the ultimate success of the individuals who are subjected to the process. The most inefficient teacher in the most poorly equipped school, if his period of service has been long enough, will point to the success of a few of the boys who once attended that particular school, as proof of the adequacy of the work which is now being done. The failures are never brought to mind. The fallacious reasoning found in such an appeal is all too common in our educational discussion. To take a selected group of individuals, who have because of native ability, and possibly because of favorable environment achieved distinction; and to claim that this success is due to our system of education may be satisfying to our pride, but cannot appeal to our good judgment. The only available measure of the success of the work done in any particular school is to be found in the changes which are brought about in boys and girls, young men or young women, during the period of their school life.

It has been argued too, that that which is most worth while in education cannot be measured. Those who advance this argument speak continually in terms of "atmosphere," "spirit," and the like. There are two replies to be made to this contention. The one is that any power which the teacher has,



whether it is called influence, or ability to teach arithmetic, must result in some change in the children who are taught. Another equally valid answer is to be found in the fact that the best teachers of arithmetic, of literature, of geography, of history, and the other studies, are, at the same time, the teachers whose influence we value most in the school.

We have been hopeful that the sciences of biology, psychology, sociology, and economics would in their development, solve the problems of education. No one would deny the significance of the work done in these fields as fundamental to the development of scientific work in education. No one is fully equipped to undertake investigation in the field of education without preliminary training in these fundamental sciences. Progress in the science of education has come through the efforts of those men of sound fundamental training who have attacked the problems of education as such, rather than through the work of the biologist, psychologist, sociologist, or economist. If we should wait for the sciences mentioned to solve our problems, progress would indeed be slow.

Those who are unacquainted with modern statistical methods as applied in the social sciences, have at times felt that it was impossible to measure large groups of individuals who differ in ability, in interest, and in environment. It is impossible within the limits of a brief magazine article to make clear the validity of such measurement. It may be confidently asserted, however, that the measurement of a large group of individuals is, on the whole, more satisfactory than the attempt to measure a single individual. We can be more sure of the accuracy of our results in comparing two groups of children of a thousand each, than we could in the attempt to measure accurately a single individual with regard to ability in school subjects.

A most persistent objection to the measuring of results comes from those who feel that it is not fair to compare individuals or groups who are not alike in all particulars.

They would claim, for example, that we cannot compare children in spelling ability when one group comes from homes in which the English language is spoken, while the other comes from the homes of those who speak a foreign language. It is probable that this objection is due to a belief that measurement will result in a comparison of the present situation without any regard to the growth or development which has characterized the group. If we derive units of measurement in spelling, manifestly the attempt would be to measure the changes which have been brought about in any group in terms of units which are comparable. If group one shows ability ten, having advanced during the year from ability seven, it will be considered just as satisfactory as the advance which has been made in group two, which has moved from ability eight to ability eleven. In other words, the purpose of measurement is never to attempt to make all alike. It is rather to discover differences and the reason for their existence; but most of all to give us some adequate means of determining progress or change.

Let us suppose again in a matter of business administration, that one school shows a much higher per capita cost than another. This does not prove that one school is more efficiently managed than another. What it does do is to suggest that some adequate reason is to be found for the difference which exists. In like manner, one city may show a much higher cost for janitors' salaries than does another. This may suggest investigation, but it does not prove that the city with the higher cost for janitors' service is inefficiently managed or extravagant in its expenditures. It may be that the city that spends a relatively large amount for janitorial service actually gets more per dollar for the money which it spends, than does the city with the smaller cost. It is always a purpose of measurement to discover discrepancies and to raise problems.

It has been contended that it is not important to derive scales or units of measurement on the ground that the scien-

tific study of education is significant only in so far as it has to do with a careful investigation of the processes involved in growth. Those who make this contention seem to feel that a careful study of the way in which children come to form habits, to grow in power of reasoning, or in ability to appreciate, will give us the final answer concerning the methods to be employed in teaching. The difficulty with this point of view is that human beings, even though they be trained in investigation, are fallible. The only final test of the success of any method, however carefully derived, and however much of it may depend upon a knowledge of the processes involved in growth in the particular aspect of mental life which is involved, is to be found in the result achieved. Theoretically a method may seem to be perfect, and yet in terms of the results which are secured, it may prove to be a failure. If the results are not accurately measured, if we do not derive scales of measurement, we can never be certain of our conclusions with regard to the method to be employed in bringing about any particular type of mental growth or development.

Possibly the one element in the situation which has operated to retard development in the direction of accurate measurement of results, more than any other, is the tendency in education to appeal to authority and the corresponding lack of devotion to scientific investigation. It is, of course, much easier to solve the problems which one meets by taking the opinion of those who have had experience in the field. No one would deny the value of the judgment of our great educational leaders. The fact remains, however, that these same leaders would be the last ones to place their own opinion in opposition to the results obtained from a careful scientific investigation. Indeed, it is in no small measure due to the insistence of these leaders that we are coming to have adequate investigations with regard to our educational practice.

It has seemed necessary to discuss at some length the objections which have been made against the attempt to

measure results in education, rather than to devote more space to a discussion of the work which has already been done. All students of education are familiar with the early work of Rice, and with the later contributions of Thorndike, Ayres, Cornman, and many others who have contributed to the literature of educational investigation. Possibly the most significant piece of work that has been done is Thorndike's scale for measuring hand writing. We may reasonably hope to have scales derived for the measurement of abilities in other school subjects.

In administration, considerable work has already been done with reference to the cost of education, both as regards the relationship of expenditure for education to other expenditures, the question of a proper distribution of money within the educational budget, and of the proper distribution of state school funds. We can, of course, hope for much more significant work in this field as more adequate systems of accounting are introduced, and more satisfactory reports are issued. It is noteworthy that in those school systems, in which an attempt has been made to check up expenditures carefully, remarkable savings have been made. We have not yet reached the limit of possible reduction of expenditure without the sacrifice of our present efficiency. Much work has been done on problems of school organization, yet the problems of retardation and elimination will be satisfactorily treated only as we secure more accurate records concerning attendance, scholarship, health, promotions and demotions, such as are provided for by the genetic records now kept in some of our more progressive school systems. The problems of departmental work and individual instruction can never be satisfactorily solved until we measure accurately the results secured under different systems of organization.

Implicit in all of the argument which has been advanced in favor of measuring results, is the contention that education means change. If changes are brought about in the children who are being educated then there must be the possibility

of measurement. These changes may take place in habit, in knowledge, in methods of work, in interests and ideals, and in power of appreciation. Probably no one would question the possibility of measuring the change which takes place in the formation of habits. We have quite commonly been willing to measure growth in knowledge by tests which demand that students not only remember facts but that they show some ability to apply them. Whether or not a student commands a particular method of work, can be determined by observation of his method of procedure as well as by the results that he secures. If interests or ideals are changed there necessarily follows a change in activity. Any real power of appreciation will be accompanied by some change in expression.

The fact that we do not yet have scales or units of measurement which will enable us to evaluate accurately the results obtained in all of the different forms of school activity, is not an argument against the possibility of measurement. In any field the development of units of measurement is dependent upon careful investigation, and upon a realization of the imperfection of the units already used. It is only as we insist upon measurement that we can hope to have our units refined. Take for example the problem of grades or marks which are commonly assigned to students as a measure of their efficiency in doing school work. Any investigation of these units will show that there is very great variation in their application by different members of the teaching corps.

The way to bring about a remedy, is not to abolish all marks or grades, but rather to study the problem of the proper distribution of marks, and, if necessary, to weight differently the marks of different instructors. The more imperfect the unit of measure which we now apply, the greater the need for insisting upon accurate measurement.

The first step in the development of scientific inquiry in any field is found in accurate description of the phenomena involved. The demand that we measure results in education

is simply a demand that the basis for scientific investigation be made available by means of this accurate description of the situation as it exists. Some investigators in education have already been able to take the further steps in scientific inquiry which have enabled them to foretell with considerable accuracy the results which might be expected in education under given conditions. Further progress is, however, dependent upon that sort of measurement which will discover problems which are not now clearly defined or which have not yet been thought of. Of course, as inferences are made in the light of the problems suggested, there will be still further necessity for accurate measurement. When those who are charged with the responsibility of determining educational policy appeal to fact rather than to opinion, when we are able to evaluate accurately that which we achieve, educational progress will be assured and a profession of education will have been established.

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The following item is taken from the current statement of the Commissioner of Education: "From time to time I have called attention to the need in this office of an adequate staff of specialists in different aspects of American education. Along with the employment of such specialists at adequate salaries, there is need of provision for a sufficient clerical staff to enable them to work to advantage, and also provision for miscellaneous expense, especially the necessary expense of travel in this country. An organized group of such specialists, with all necessary provision for their work at Washington and in the field, is what is greatly desired. I am submitting estimates for new appropriations for this purpose aggregating \$75,000. The beginnings which have already been made by the bureau in work of this kind show that the plan proposed is practicable, and the call for additional work of the same kind which comes in from all directions shows that it would fill a distinct and urgent need." As an illustration of this work, it might be noted that, at the requests of the Deans of Graduate Colleges in American Universities, one of these experts has already entered upon the great task of securing reliable information in regard to rating of American universities and colleges.

# THE EFFECT OF PRACTICE UPON VISUALIZING AND UPON THE REPRODUCTION OF VISUAL IMPRESSIONS.

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## SUMMARY.

Real objects, pictures, and nonsense-drawings were shown to three observers for moderate times (10 to 60 sec.). Exact reproduction by drawing, sometimes supplemented by written description, was then required. Stress was laid upon introspection of the observing and reproducing consciousness. Each observer devoted to the work about forty hours, distributed through ten weeks.

Ability to reproduce increased with practice, although the increase was rapid at first and slow later. The greatest gain of final over initial ability was 44% ; the least, 6%.

The chief reasons for the practice-improvement were:

1. Confidence and "doing one's best" replaced discouragement and "giving up."
2. Familiarity with material lessened the difficulty.
3. The observers learned where and how to distribute attention effectively.
4. More efficient methods of work were adopted. Tricks of counting, naming, grouping, etc., were discovered and used.
5. Regular and definite procedure replaced hap-hazard, unorganized procedure.

In no case did practice increase the ability or even the tendency to *visualize*. The best reproducer of visual impressions was the poorest visualizer, and relied almost wholly upon verbal cues for recall.

Our results show that the ability gained is very specific.

## THE PROBLEM.

The problem, as we first roughly stated it to ourselves was: What is the value of such a formal training in "visualizing" as is sometimes recommended for school exercises? By the

use of carefully graded material and properly arranged series, we proposed to measure the observers' initial and final ability to represent to themselves in image, impressions recently given in sensation. By requiring detailed introspections we hoped, if possible, to discover the factors or processes concerned in observation and reproduction, together with their relative importance. This knowledge should then enable us to say why observers differ in ability and in capacity for training this ability, and to determine the dependence of ability upon kind of material, amount of practice, etc. Such knowledge should also enable us to judge from the similarity or identity of factors concerned, in how far practice-effects are transferable, *i. e.*, how far they are of value for work with other kinds of material and under other conditions. It will thus be seen that we aimed to supplement Professor Whipple's study of the effect of practice in visual apprehension as conducted in this laboratory (13) by lengthening the duration of exposure and by laying stress upon the visualizing process itself. Kuhlmann (14) also made an analytic study of consciousness during the recall of visually presented forms, but his problem, unlike ours, was primarily a qualitative, rather than a quantitative one.

#### THE OBSERVERS.

The observers were Dr. L. R. Geissler, (*G*), instructor in psychology; Dr. Helen M. Clarke (*C*), late fellow in psychology; Miss Alma DeVries (*V*), a graduate student in psychology. All were thoroughly trained in introspection and familiar with laboratory methods. None, with the exception of *G*., who had taken part in Professor Whipple's apprehension tests three years before (13), had had previous training in work at all similar to ours. Moreover, in *G*'s case, material and experimental conditions of this experiment were so different from the former one, that he himself denies that he could discover any advantage gained from previous training. Results confirm this opinion.

Before the experiment proper, all three observers were



tested as to ideational type by the use of Bett's Questionary (4), and by questions as to verbal imagery and its use. *G* has exceptionally poor, sketchy images in all sense departments, except kinesthetic, where his images are good. He reports that his visual and auditory images are rare, and that he does most of his work in kinesthetic, especially kinesthetic-verbal terms; and ordinarily in sensory rather than imaginal terms. *V* has complete and vivid images in all departments, but reports that she tends to use visual images whenever they will serve. She uses few word images. *C* is of mixed type, and has good images in all modalities except audition. She reports that her mental processes are predominantly of the visual and kinesthetic-verbal type.

#### THE MATERIAL.

Six kinds of material were used:

1. Ink dots on 1.5×1.5 in. white paper. They were arranged at haphazard upon the intersections of imaginary lines 0.25 in. apart. The dots varied in number from 7 to 14; average, 10. After exposure the observer was required to reproduce them at the proper intersections on 0.25 in. cross-section paper.

2. Irregular closed polygons formed by lines joining dots arranged as in 1. The number of lines was 8 to 10; average, 9. Reproduction on cross-section paper as in 1.

3. Nonsense figures drawn on white cardboard in India ink. These were composed of lines  $\frac{1}{4}$  in. broad. The lines were of three lengths— $\frac{3}{8}$  in.,  $\frac{3}{4}$  in., and 1.5 in.; and of four kinds—straight, curved, dotted, and wavy. They were arranged by chance, end to end, at angles of 0°, 45°, and 90° to each other, so as to form a fairly compact, connected group. Number of lines, 8 to 12, average, 10.

4. Figures drawn with a fountain pen on cardboard of the same size as in 3. They were intended to suggest objects such as trees, birds, airships, etc., but always contained too few or too many lines for a good representation. Average

number of lines, 12. In actual work the observers seldom (only nine times in some two hundred) got a meaning for the figure as a whole. This material, therefore, although labelled suggestive, is classed with the above three kinds as nonsense material.

5. Drawings and photographs of real objects, such as houses, churches, mills, etc., the main lines of which were at once apparent.

6. Objects found in the educational laboratory and museum, such as tools, small models, and bits of apparatus, with not too many details.

As this description indicates, the material was so selected or constructed as not to give an advantage to the observer who excelled merely as a draughtsman, but so that the report of each observer might serve directly as an index of the completeness and fidelity of his memory.

#### METHOD.

The observation periods were always in the morning, and as far as possible, at regular hours. Three to five hours per week were spent by each observer (*O*), one hour being the most spent in any single day by any observer. The experimenter (*E*) sat at a table opposite *O*, gave a 'ready' signal, exposed the card by placing it face up on the table before *O*, and kept the time by a stop-watch. In general, the exposure was regulated (by a test series on others than the regular *O*'s) so that it should be short enough to encourage maximal effort and attention, and yet long enough so that *O* might 'run over' the whole in detail and 'see the parts clearly' at least once. The time for all nonsense material was 10 sec., and repeated exposures of this length were made up to the first faultless reproduction. For sense-material, the times varied from 20 to 60 sec., according to the complexity and difficulty of the material presented.

*O* was instructed as follows: "Look at the stimulus attentively. Try to 'blaze it into your mind' so that you can draw an exact copy from memory. Make your drawing as accurate,

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detailed, and complete a copy of the original as you can. What you cannot possibly draw or indicate, you may describe in words."

The order of experiments was this: A series composed of one each of the different kinds of material, in the order 1, 2, 3, 4, 5, 6, (dots, polygon, nonsense-figure, suggestive, picture, object) was given and then a new series began. About thirty such series were given to each *O*. (*V* missed five series through absence from town, but was given the full number of dots in order to have a basis for comparison with the other *O*'s.) Although within each kind of material there were differences in degree of difficulty, (*e.g.*, 7, 9, 10, 14 dots), the *average* degree of difficulty was kept constant for each group of five successive series. Detailed introspections were called for, and changes of method or attitude, were always noted as soon as they appeared.

No scoring was done until the whole experiment was finished. Then *E* examined all the drawings and reports and marked in percentages the proportion of the stimulus correctly drawn after the first exposure, and in the case of nonsense material, also counted the number of reproductions necessary for the first faultless reproduction. Of course, in the case of the more complex sense-material, the scoring could be only approximate, but the nonsense material easily lent itself to more accurate marking. Here, since the figures were arrangements of a few elements, it was easy to define and evaluate the kinds of mistakes, as for example, omission or insertion of elements, mistakes in the kind of element in a given position, its direction, etc. Arbitrary rules were followed which rendered the scoring of the several *O*'s strictly comparable.

The experiment naturally falls into three periods:—I, the initial period, composed of the first five series, characterised by small percentages and a large number of repetitions necessary for faultless reproductions, together with large mean variations; II, the practice period embracing the next

twenty series (except in case of V where the number of series is 15 except for dots), characterised by a gradual increase in percentages and a decreasing number of repetitions; and III, the final period of five series, which serves as a measure of ability at the close of the experiment.

Table I shows the average percentages and average number of repetitions for each period and for each *O*.

TABLE I.

O	Grp.	Dots		Polygons		Nons. Fig.		Sugg. Fig.		Pict.	Obj.
		%*	Rp.**	%	Rp.	%	Rp.	%	Rp.	%	%
G	I	.61	2.4	.79	2.0	.60	3.2	.86	1.6	.74	.65
	II	.93	1.5	.93	1.3	.79	2.3	.93	1.4	.80	.76
	III	1.0	1.0	1.00	1.0	.91	1.8	.97	1.4	.82	.81
C	I	.65	3.6	.38	6.2	.48	5.6	.70	3.2	.59	.55
	II	.84	1.7	.63	2.6	.58	3.9	.70	3.0	.64	.61
	III	.94	1.4	.82	2.4	.74	3.2	.90	2.2	.69	.61
V	I	.54	4.2	.31	5.2	.55	3.8	.68	3.5	.65	.60
	II	.81	2.1	.67	2.9	.65	3.2	.75	2.9	.75	.70
	III	.82	2.2	.75	2.0	.74	2.6	.88	1.9	.75	.72

\*%=% correct on first reproduction.

\*\*Rp.=number of repetitions required for first faultless reproduction.

## RESULTS.

1. That practice increased the *O*'s efficiency in reproduction is evident at once from the table. The percentages for all *O*'s and for all kinds of material are considerably higher in the final than in the initial period. Gain in efficiency ranges from 6% to 44%; average 22%, and in the case of nonsense material, practice saves from .2 to 3.8 repetitions.

2. A striking fact is that gains in ability are so large at first and so small later in the experiment. The gains of II over I, (that is, in the first half of the experiment) vary from 5% to 36%, average 15%, and from .2 to 3.6 repetitions, while

those of III over II, (last half of the experiment) range only from 0 to 19%, average 7%, and from—.1 to 1 in saving of repetitions. The reasons for such a distribution appear clearly in the introspective reports of the *O*'s.

At first *O* is confused and uncertain; at a loss to know how to work, hesitating, discouraged. In Period I we find common to all *O*'s such reports as: "The material is strange, unfamiliar, crazy." "I did not know what to do," "I didn't know how to work," "I was confused," "I was disturbed," "Attention skipped from one part to another, was caught by certain details and disregarded others," "I did not know what to attend to until I discovered what kind of mistakes I was making," "I learned only gradually how much time I had and how to distribute it," "It was hard to split up the drawing into groups without getting confused," "I felt that I simply could not do it."

Moreover, at first, in drawing, the *O*'s were inclined to indicate somewhat roughly the general aspects of the figure, instead of being careful to give each line a correct direction and length and so to produce a copy correct in detail.

By the end of Period I, however, many of these difficulties were partially overcome. By this time the material was familiar; the *O*'s "knew what sort of stuff was coming." They had seen similar figures before, knew in many cases the elements of which the figures were built, and were no longer distracted or confused by novel conditions. They narrowed attention to essentials. They knew, too, what was essential and what was likely to be forgotten. They adopted a fairly definite method of procedure. They directed attention to parts in a regular order, knew how much time they had, distributed it properly; discovered and used tricks of grouping, counting and naming kinds, lengths, directions, etc. When material was presented they were 'set' definitely to meet the situation in a given way. They no longer "gave it up" or failed to do their best because of a feeling of discouragement or helplessness.

On the other hand, during Periods II and III, the method of work and the attitude changed relatively little, and few additional tricks were discovered. The improvement here is due in general to a development of the old, rather than to the discovery of new methods.

3. Table I also shows that gains with sense-material are relatively small; with nonsense material, relatively great. The average final nonsense gain is 28%; the average final sense gain, 10%. The explanation of this fact is threefold.

First, since nonsense material was repeated up to the first faultless reproduction all favoring factors of practice had so much the more chance to show their effects.

Secondly, the nonsense material is somewhat less difficult because within each form of it certain elements are continually repeated in different arrangement. The elements of sense-material are not so easy to determine. Although perhaps we may speak of tree, door, window, square, screw, etc., as elements, they are not constant from picture to picture, and they are not so often repeated as are the elements of nonsense material.

Thirdly, the introspective reports show that nonsense material, by its very nature, offers a greater chance for tricks of counting, naming of definite directions, etc., and lends itself more readily to a constant, orderly method of work. *O's* report, for instance, "I group the dots in geometrical forms, lines, triangles, etc.," "I imagine the dots and polygons placed upon cross-section paper as I look at them," "I count the dots and lines," "I name directions and length," "I count imaginary squares," "I note in verbal terms 'lines meet 3 from left, etc.'," "There is a regular space-time order which my eyes nearly always follow, left upper corner, across, down, across, up." With sense material the *O's* find less chance for such helps. They attribute gains here to more general factors, such as gain of confidence, and knowledge of how to distribute time and attention.

4. The *O*'s differ considerably in initial and final ability. See Table II.

TABLE II.

OBSERVER	NONSENSE MATERIAL		SENSE MATERIAL	
	Initial Av.	Final Av.	Initial Av.	Final Av.
G	.72	.97	.70	.82
C	.55	.85	.57	.65
V	.52	.80	.63	.74

The explanation of these individual differences is neither easy, simple, nor certain, but facts may be mentioned which have an important bearing.

We judge the temperament of the *O*'s to be of considerable importance, especially in its bearing upon the results in the initial series. *G*, whose percentages are highest, is by nature calm, steady, and unexcitable. Even at the beginning of the experiment his work was methodical and persistent. He is, moreover, an intensive worker, easily narrows attention to the matter in hand, and is not disturbed by conversation or noise. *V*. and *C* are not such intensive workers. Both of them, and *C* especially, were much confused and disturbed by the new material and conditions and were much more easily discouraged than was *G*.

Another and even more important difference between *G* and the other *O*'s was the type of imagery prominent in consciousness, while working. During exposure *G* moves his eyes slowly and in a constant order over the card or object, attending to his visual and kinesthetic complexes, and at the same time maintaining an almost continuous internal speech. He groups and counts parts, names directions, parts, lengths, positions, and notes in abbreviated verbal form many significant points about content and arrangement. He is under a steady muscular strain. In drawing, he reports: "Eyes

and attention follow the same order as in observing," "The movements seem almost to shoot off of themselves from some faint kinesthetic image (eye, throat, hand,)" "Practically never a visual image," "Muscular strains gradually letting down as drawing progresses."

*C* and *V* attend during the exposure chiefly to the visual aspects of the stimulus. They follow over the picture in a rather definite order, grouping elements into various forms (usually without the form being named). *C* sometimes makes verbal notes; *V* rarely does so. *V* reports tension; *C* is more passive. Both report that the drawings are to a great extent copies of visual memory-images, or at least are preceded by, "touched off by," such images. *V* believed that she did better work when words came naturally, but found voluntary effort to name difficult and disturbing, and quickly gave it up. Both report that they have at times 'visual images of the whole stimulus,' but think that such recall is useful rather for correction of the drawing when once made than for construction. *V* says: "If I want to draw an object actually before me, I have to attend to details one at a time. So in drawing from memory, I follow the images of details or parts in constructing and depend upon my image of the whole as a check upon whether the general proportions are correct are not."

5. Contrary to expectation, no *O* reports any increased ability to *visualize*, or any tendency to visualize more because of our sort of practice. The work of observation or reproduction may be surrogated, transferred to a given sense-department, according to the *O*'s ideational type. Such surrogation may even be advantageous. Here *e.g.*, in the reproduction of *visual* impressions, *G*, the best observer, is the one who *visualizes* least, and *V*, ordinarily visual, reports a slight tendency to verbalize more.

#### CONCLUSIONS.

How, now, shall we answer our original question of the value of formal training in visualizing and in reproducing visual impressions?



We have found that practice such as ours does increase ability to reproduce our sort of material. We see, however, that this increased ability is dependent upon the particular material, time, instructions, and other conditions of the experiment, upon familiarity with these conditions, and upon confidence based on the familiarity. Practice, in other words, is specific. Practice with one set of conditions is valuable in a new set, only in proportion as the second set of conditions contain identical ability-conditioning factors. Some tricks, *e.g.*, gained in practice with dot-figures are valueless in the work with other kinds of nonsense material or in work with sense material. That training in these experiments has made the *O*'s noticeably better observers or memorizers in general, or given them any habits of observing closely or reporting correctly, or furnished any ability to meet better any situations generally met with, neither we nor the *O*'s themselves believe.

It appears, moreover, that little ability is gained by continuing practice beyond a certain relatively short time.

Specific practice is demanded for best results and becomes quickly effective. It seems, therefore, as if the value of formal training of our kind had been greatly overestimated. However, our experiments were made upon adults who were already trained in habits of attentive observation, and we have no right or wish to extend our conclusions in wholesale fashion. It may be that, for immature or untrained persons, practice in visual reproduction might possess a general value that was not discovered under our conditions.

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## THE PROBLEM AND CONTENT OF A COURSE IN THE SOCIAL ASPECTS OF EDUCATION.

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Probably no student of education questions the desirability of devoting some attention to the social phases of that subject in a well-rounded teachers' training course. In fact such would seem to be the logical outcome of the recognition of educational activities as aspects of social activity and as bearing some important relation to social progress. Moreover, the processes of learning in the individual are conditioned to a large extent by the social environment both within and without the school, and this would seem to warrant approaching educational psychology in part at least from the point of view of social psychology. Furthermore, there is a growing recognition that the end of education, state it how we may, must for one thing take account of the fact that the child is, and will probably continue to be, a member of society and that his efficiency as an individual will almost inevitably be measured by social standards of some sort. Manifestly the teacher should have a sympathetic and thoroughly practical insight into these social factors, conditions, and relationships, if he is to be a master of his craft.

But while all these things may be admitted to be true, there are doubtless many that feel an uncertainty as to how to instruct the would-be teacher profitably along these lines. The facts and relationships of social education have not yet been brought together in any comprehensive way. There is much excellent material scattered through many magazines and journals but it needs to be organized and evaluated.

Several very suggestive books have recently appeared dealing with limited portions of the field, but there is as yet no generally recognized statement of the problems and the content of a course in social education which is really scientific, that is, which is more than a mass of mere empirical details. If any body of fact is to have serious consideration in the scholastic field it must have fairly definite and well-recognized principles of organization. Thus, while the social implications of education are evident enough, most of the work offered teachers in their professional courses has been relatively individualistic. In educational psychology, for instance, the development of the mental process is described as if it took place largely within a social vacuum. The history of education is clearly an account of events that have been selected out from the general history of social development and yet in teaching the subject there is usually all too little emphasis laid upon the connection between the successive events in educational history and the social matrix from which these events inevitably sprang. In the same way the problems of superintendence and administration are at the bottom essentially social problems but they are not usually presented in the light of this their broader setting.

With reference to this state of affairs, two things might be done with profit. First of all in the presentation of these standard educational subjects there should be a juster recognition of important social relationships. For myself, I know from repeated experience with classes in educational psychology that it is possible to introduce the social element in a quite organic and satisfactory manner and the students thereby get a better balanced notion of the conditions of mental development. The other professional courses could be socialized in like manner, not through the tacking on of any adventitious material, but through the introduction into them of facts which properly belong there and which have been ignored because of narrow traditional views of the subjects.

Over and above all this, however, there should be a *specific*

course or courses in social education. The subject of the social relations and implications of education is so large and so vital that it requires separate treatment. Such a course should give a comprehensive and stimulating as well as a practical survey of educational activities from the point of view of their internal and external social relationships. I shall not here attempt to state the various view-points which may serve to differentiate all the desirable as well as the possible courses in social education. I wish rather to describe the particular type of course which is offered in the State University of Iowa as an attempt to meet the need which has been set forth in the preceding paragraphs. It is described in the hope that criticism and discussion may result and that the time may soon come when a course of this character may become a recognized and necessary part of the professional training of teachers. The course as given here is a relatively advanced one, designed for seniors and prerequisite, it is not required. It is thought necessary in any graduate students. While previous work in sociology is desirable, it is not required. It is thought necessary in any case to introduce a certain amount of sociological theory in order that the course may be intelligible and profitable to those who take it. Even the sociology student will need to have his attention called specifically to those aspects of his science which have a bearing upon education.

In general, the object of the course is to secure to the student a broad and suggestive view of education in all its social relationships and more specifically with reference to its relations to social progress. This latter point is considered the problem of the course and it is stated thus: First, to what extent may educational forces be regarded as definite avenues of social progress and, secondly, to what extent may certain educational forces, the school in particular, become more efficient as agencies of instruction as well as more effective promoters of social progress through a recognition of their broader relationships to society at large and their

internal character as social groups? In other words there are two sets of relations to take into account, those of the school to society at large and those within the school itself as a social microcosm. The assumption is that a more intelligent appreciation of both sides will render educational forces more efficient for progress.

The course is divided into three parts. In the first we take up the broader social relations of the various educational forces of the country. This affords a concrete beginning which is fairly comprehensible to all students. The second part is devoted to the discussion of sociological theory, and especially those aspects of social psychology which bear upon education. The third and last part of the course deals with the internal relations of the school as a social group, its bearing upon the life of the school, in general and upon the learning activity in particular. In this section, also is included a study of the personality in so far as it seems to be socially determined. The sequence of topics in this outline is not rigidly logical. It is merely a working scheme which seems to me best adapted to the needs of the student who has done some little work in education and who yet must be appealed to by the concrete rather than the philosophical aspects of the subject. I may say in passing that every effort is made to have the treatment of the various topics as concrete as possible. The description offered here is of course lacking in all those concrete details that must be depended upon to make it vital to the student.

Regarding the content of each of these sections, the following summary statements will perhaps suffice. In the first we start with a brief study of the educational efforts of certain savage peoples in order to see concretely how such activities are gradually differentiated out of a general matrix of social processes. The fact is illustrated and emphasized that in the beginning educational schemes are clearly socially determined and that they, perforce, reflect some genuine social needs. As the school is finally set off as an institution

to exercise specifically the teaching function, it is noted that it acquires a certain momentum of its own, which tends to separate it from the main current of social processes and hence to render it more or less irresponsive to social needs. New and insistent demands on the part of society find expression only gradually in the reconstruction of the established educational agencies, and, on account of this, such demands are apt, in our day at least, to be met by privately initiated and supported schools.

After reviewing briefly the diverse types of modern educational agencies, both public and private, from the point of view of their being the expression of more or less definite social impulses and needs, we turn to the problem of the social duties and responsibilities of the school as implied in this intimate relationship to the life of the community. The school should be in constant and intimate touch with the community which supports it and yet a little ahead of it, helping it to become conscious of the best that is in itself and showing it how the more fully to realize its best possibilities. It is pointed out, for example, that it is the duty of the rural school to interpret and to take a hand in the development of rural life, and to awaken the interest of country boys and girls in country problems. It is safe to say that a school that educates the large majority of its children *away* from the community, and its dominant interests should be open to serious question as to its ideals and its methods. The teacher of pioneer times, who 'boarded around' and was in various ways an organic factor in the social life of the community, is contrasted with the rural teacher of today. If the school of today is to occupy the place it should in society and if it is to perform the functions which we have seen it was intended that it should perform, there must be close touch between teacher and community and especially between teacher and parents. The teacher and the parent have slightly different points of view and a frank, friendly acquaintance of the one with the other will be of mutual benefit. Various attempts

to realize this need, such as parent-teacher associations, are examined and discussed.

We next study current tendencies toward an extension of the school's sphere of influence in the social body and inquire into the possibility and propriety of still further extensions in the future. It is one of the significant features of the present educational situation that there is in progress a great broadening of the traditional notions of the proper functions of the school. The most significant of these newer ideas is that which regards the school as capable of being developed into a real social or socializing center in the community. The functions of the school as a social center will differ according to the community. In some places it may assist in bringing together and unifying diverse social elements, the adults as well as the children. It may become a sort of clearing house between different industrial, social and racial strata of our society. This is now being undertaken in increasing degree by means of clubs, lecture courses, vacation schools, continuation schools, trade schools, and by the development of the playground and the school-garden idea. They are largely the expression of the conviction that the conception of the teaching function should be broadened until the entire community is brought within the spiritual environment and influence of the school. On the side of equipment this idea finds expression in the common expression, "The full utilization of the public school plant."

In connection with this discussion of the broadening of the schools' sphere of influence, the problem of the relation of the school to social progress is examined. Is it possible to find theoretical justification for these extensions of the school's activities? Can the school take an active part in the general social movements which surround it in a way peculiarly its own, or is its duty fully met when it provides for the intellectual and moral instruction of the children of the community? One answer to these questions comes from a recognition of the organic relation of the school to the



general social plexus. The school as one of the phases of social activity would seem to have some part to play in social progress. That is to say, there is no particular part of society that has as its special function the securing of progress. Each part must contribute its impulse to the larger movement. It should be the business of each social institution to attempt constantly to extend its sphere of operations. It is only by thus keeping dynamic that a function can maintain itself in a progressive society. The teaching function belongs pre-eminently to the school and, in addition to striving to perfect its old avenues of exercising this function it should systematically study to work out new avenues and modes of expression. A progressive society will require an almost indefinite extension of the teaching function as it appears in primitive society. Just as the religions of the higher races have advanced far beyond the primitive levels so that the modern activities of religion are hardly recognizedly akin to the primitive types, so the activities of the school have expanded and should continue to expand. There is no necessary limit to the development of any function except the limit of resources and the possible pre-emption of the field by some other social agency.

Turning now to the concrete phases of the question, we consider the social responsibility of the school for a broader and more definite training in citizenship. This means that the school has a certain part to play in the development of better systems of social control than are at present in vogue. One important step in this direction consists in emphasizing in various ways the social significance of the ordinary knowledge content of the curriculum. A purely individualistic training means less today than ever before and is in itself ethically wrong. Various other unused opportunities within the school for the developing of citizenship are considered. The social function of the school not only in the matter of vocational training, but as well in the matter of assisting the youth in a wise choice of vocation belongs here.

Lastly, in this section, we consider the relation of the school to social reform. It is seen to be an agency not merely for preserving desirable variations, but as well an avenue through which definite efforts for corrective and regenerative work may properly be put forth. The George Junior Republic is typical of the sort of work here considered.

In Part II of the course is a brief discussion of certain aspects of sociological theory which have more or less direct bearing upon the general conception of the school as a social organ and particularly upon its internal character as a miniature social group. The main object here is to develop the notion of what a social group is and what its implications are for education. The sociologist will feel that this is quite inadequate, but it seems to me the best adjustment of a difficult problem. Such a course as this is primarily educational rather than sociological. It will not do for it to encroach upon ground of the sociologist. This brief and, to the sociologist, quite inadequate reference to social science will, however, be merely suggestive to the student of that subject of a point of view which he will be quite able to elaborate in the light of his broader study. On the other hand, the student without a preparation in these lines will receive some assistance in the understanding of the important points of the section which follows:

The students read most of Cooley's *Social Organization*, portions of the same author's *Human Nature and the Social Order*, Ross' *Social Psychology*, and selections from various other works which develop the concept of social influences and in particular of group activity. The following is a very brief statement of the content of this section of the course: modern theories of society are contrasted with some of the views of earlier thinkers to the effect the society is a mere aggregate of individuals who have consciously banded together for offence and for defence. As against these older views the hypothesis is offered that social organization is probably instinctive, antedating any conscious purpose on

the part of individuals to join together. Moreover, various modern sociologists have shown that society may be said to possess in a broad sense a mind, a will, characteristic habits or modes of behavior, and in fact, in quite a proper sense, to be an organism. Others have pointed out the mental and moral life of the individual have a definite social character, implying that morality is a characteristic of social groups rather than of the individual taken by himself.

The characteristics of social groups are briefly considered, namely, their suggestibility and imitativeness, their liability to panics and crazes, their fashions, customs, mannerisms, their subserviency to leaders, their tendency to co-operative activity, their common modes of feeling and of expression in language, art, religion, and morals. The most elementary forms of social groups are the small collections of individuals found in the family, the neighborhood, and the playground, called by Cooley "primary groups." The school also may be considered a "primary group." These are studied as the "nurseries of human nature," as furnishing the most favorable conditions for the development of ideals of loyalty, of truth, of service, of kindness, of lawfulness, of freedom, and of "natural right." We study in this connection the group tendencies of children of about twelve years and up. The literature dealing with this phase is, of course, plentiful and worthy of careful study.

Part III begins with a statement of the reasons for regarding the school as a social group, and especially as a "primary group." It has a certain unity of purpose, it is composed of persons of about the same age, and of about the same intellectual, emotional and instinctive life. These characteristics tend to fuse the pupils together into a sort of spiritual unity, in spite of social differences without the school. The school atmosphere is especially favorable for the development of "the primary ideals."

If the school, as suggested, is a true "primary group," rather than a mere aggregate of individuals with duties only

to the teacher, important consequences, not only for the general life of the school, but also for learning activities that are supposed to be carried on through its machinery. We undertake here an extended examination of the social life of the *ordinary* school as well as of those schools which have given special attention to the development of an internal social life. The reason for giving conscious attention to this inner social life is seen to be not for providing mere social enjoyment of which there will usually be a plenty both within and without the school. It is rather with the object of *controlling* this life and securing a normal and useful unfolding of the child's social self, which, under modern conditions, is almost sure to be distorted or utterly neglected. The need here is as genuine as is the need for the control or direction of the child's intellectual growth. Certainly the social importance of the development of sympathy, of courtesy, of co-operative capacity, of the capacity for a healthful enjoyment of the society of one's fellows is as important as the development of any of the purely intellectual functions. It would seem that the attainment of the ideal of social efficiency, held by some to be the best statement of the end of education, can come only through close attention to the social aspects of the school's life.

One of the sub-topics here taken up is that of the power of personality and the development of leadership in the school, the nature and possibilities of the teacher's influence, the origin and significance of the student leader. It is seen throughout this phase of the subject that as much if not more depends upon the organizing ideals and administration of the school, that is, upon the opportunity afforded for the play of imitative and for the formation of self-organized groups on the part of the students, as upon any compulsory social organization forced upon the children from above.

We take up next the social atmosphere of the school for the learning activity in particular. Mental development itself may be regarded as a socially conditioned process, as

is brought out in the writings of Baldwin and Royce, and in two important articles recently published in *Science* and read at the Educational section of the A. A. A. S. held in Boston, December 1909.<sup>1</sup>

Effectiveness in the *preparation* of the lessons as well as in their recitation is seen to be dependent in important ways upon the social medium. The most genuine learning is seen to be often a co-operative activity. The opportunities afforded by the various school studies for this co-operative activity and for the development of the social self in general is examined in the light of such concrete experiment as is reported in Dewey's *School and Society* and in Scott's *Social Education*. A very fruitful subject is that of the recitation as a social process in even the ordinary school. It is pointed out that the effectiveness of the recitation can be greatly enhanced by a more systematic recognition of and cultivation of this fact. The recitation is not so much a time for testing the individual pupils as it is a give-and-take process among all the pupils and the teacher taken together as forming a single social group. The recitation thus conceived and worked out affords fine opportunities for the development of the pupil in many directions. Ordinary conversation in the home as well as in the school is an educative medium of no mean importance, if it be cultivated in the right spirit and with a proper understanding of its possibilities. It furnishes an almost ideal opportunity for the free interchange of ideas and the growth of meanings and is a most important stimulus to mental activity in general.

The closing work of the course deals with the social character of personality and the dependence of a genuine education in morals upon the social factors and processes heretofore discussed.

<sup>1</sup> G. H. Mead, "The Psychology of Social Consciousness," *Science*, Vol. XXXI, p. 688.

Burnham, "The group as a Stimulus to Mental Activity," *Science*, Vol. XXXI, May 20, 1910.

I have here tried to indicate the trend and scope of the course in social education as it is now being given. Just what should be included in such a course is still open to question. I shall be very glad to receive criticisms and suggestions from those who are interested. One difficulty experienced in the conduct of such a course grows out of the scattered state in which the material is found. If courses in social education are to be developed and given generally in the colleges, normal schools and universities, it seems to me that a large 'source book' of materials would find a wide sphere of usefulness. This book should contain representative extracts from books and especially from the best periodical literature covering every phase of the subject. These should be properly organized according to the recognized divisions of the subject and should be accompanied by appropriate introductions, summaries and full bibliographies. I should be very glad to know what others think of the feasibility of such a scheme.

M. Eugene Martin, reporting to the Society for the Psychological Study of the Child (Paris) the results of an extended investigation on the work of school children at different hours of the day, lays great emphasis on habits of work. It makes little difference, according to him, whether the most fatiguing exercises are assigned to one hour of the day or another, but it makes a great deal of difference whether the children are tested at the time they are accustomed to be actively engaged in a given exercise. The essential thing for school practice is to build up regular habits of work.

Dissatisfaction with the results of the education of deaf mutes in Italy has led to the establishment in Milan of industrial courses for such defectives. Heretofore their education has been chiefly of the intellectualistic type, and when they have finished their course they have been unable to do anything which employers want them to do. Under the new plan they will be expected to specialize in some form of practical accomplishment, and thus, while they may not all attain to higher careers, they will at least become capable and efficient artisans.

## COMMUNICATIONS AND DISCUSSIONS.

### REPORT OF THE MEETING OF THE AMERICAN ASSOCIATION FOR STUDY AND PREVENTION OF INFANT MORTALITY.

The first annual meeting of the American Association for Study and Prevention of Infant Mortality was held at Baltimore November 9-11. There was thrown open to the public an exhibition that might almost be termed spectacular, so impressive was the arrangement of models, charts, pictures and instruments bearing upon such matters as feeding and dietetics, diseases of childhood and infancy, educational prophylaxis, economics and eugenics, birth registration, the causes of infant mortality, the institutional care of infants, etc. Popular lectures, free consultations, moving pictures and similar devices added to the attractiveness of the exhibit.

The formal sessions of the association, which were held at McCoy Hall, Johns Hopkins University, were the occasion for the assembling of a notable group of physicians, philanthropists, sociologists, educators and others prominent in various lines of civic work. At the opening meeting, for instance, there were heard Cardinal Gibbons; M. Jusserand, the French ambassador; Professor Fisher of Yale, and Drs. Jacobi and Welch. At the four following meetings attention was given to philanthropic, to medical, to municipal, State and Federal, and to educational prevention of infant mortality.

The fifth session, devoted to educational prevention, was under the chairmanship of Dr. Helen C. Putnam of Providence, and considered the general theme: "Healthy parents, right customs and wholesome environment being essential factors in preventing infant mortality, how are normal institutions fitting teachers to establish through public schools better practices in hygiene and sanitation, and higher ideals of parenthood?" The chairman's address depicted the status of instruction in personal and school hygiene as observed by her in 40 normal schools. The situation was not calculated to inspire much satisfaction, for in the greater part of the institutions visited

the instruction was either lacking altogether or given in a perfunctory manner quite at variance with the printed announcements of courses.

A better state of affairs was, however, indicated in the institutions represented by the speakers that followed. Dr. Herbert Burnham Davis, president of the Southwestern Normal School of Pennsylvania, explained the plan utilized in his school, in accordance with which the course in hygiene was made concrete and realistic by the actual study by the pupils of the normal school of the hygienic condition of schoolrooms and of school children. Professor Whipple gave a short account of certain phases of the work in school hygiene at Cornell University, dwelling upon the feasibility in college work of using instruments of precision for demonstration and research, and thus of putting the work in school hygiene upon the same plane as that of other and better established branches of science. Miss Flora Rose told of the instruction in home economics given at Cornell University, and Miss Abby Marlatt of similar courses at the University of Wisconsin. Prof. Jessie Phelps of the Michigan State Normal College read a most interesting and significant paper descriptive of a course in biology, which was carefully planned to introduce instruction in personal, especially in sex, hygiene. We quote from notes of this paper printed in *The Survey* (November 26) as follows:

"How is the Michigan State Normal College fitting its students to establish, through the public schools, better practices in hygiene and sanitation, and higher ideals of parenthood? Our student body, like that of most colleges and normal schools, comes to us unaware of the existence even of the problems of parenthood, infant mortality and health conservation.

"To enlighten them we have established three regular courses—one on infant diet, another on general hygiene and a third on special physiology for women. We give sex instruction a broad scientific basis; we give it a biological and evolutionary setting; we make it natural. Such topics as masturbation, prostitution, syphilis and gonorrhea are handled briefly but frankly. Courtship, marriage, home-keeping, dress, women's work, the rights of children and methods of instructing children in the fundamentals of sex life are considered. It goes without saying that all this work is presented without excuse or apology. We believe that if a child is early and



correctly taught, he is much less likely than otherwise to fall into wrong practices. The old method of letting a child alone in his life explorations usually results in his finding, and that right early, only the distorted and untrue concerning matters of sex. Toward the close of the course in special physiology a few round-table discussions are held, in which the young women eagerly take part, relating what they have seen in the classroom among the children, how they themselves were instructed in matters of sex, what they consider the proper attitude of lovers, married people, parents, children. As much time as possible is given to private personal conferences.

"Two hundred and fifty-one students have elected these courses, and nearly all are teaching. Many write me of what they are doing to instruct mothers and children. Some have established parents' meetings, and all from whom I have heard—some hundred—say that they are glad of their training in sex physiology; that they find constant use for it in school and society; that it has made for better personal hygiene and saner social relations. They declare that they are better guardians of children than they could have been without it."

Following Professor Phelps, Dr. W. S. Small, lecturer on school hygiene at George Washington University, made a vigorous plea for vitalizing the work in school hygiene by constant reference to the child as the central problem. Remarks were made by Dr. L. F. Barker of the Johns Hopkins Medical School, Professor Winslow of the College of the City of New York, and others.

The section on educational prevention then unanimously adopted the following resolutions: "That the American Association for Study and Prevention of Infant Mortality urges (I) 'Boards licensing teachers for public schools to give as detailed tests in elementary hygiene, sanitation and biology as are given in mathematics or in language,' and (II) 'State boards of education, together with State boards of health, to provide, in the rural schools, for conferences of mothers, and for home instruction, in connection with these conferences, of mothers and expectant mothers in maternal and infant hygiene.'"

At a special evening session timely addresses upon the problem of social diseases and instruction in sex hygiene were delivered by Dr. Helen Putnam and by Prof. C. R. Henderson of the University of Chicago. The last-named speaker was chosen as president of the

association for the coming year, and Chicago as the place of the second annual meeting.

G. M. W.

### CENTRAL ASSOCIATION OF SCIENCE AND MATHEMATICS TEACHERS.

The annual meeting of the Central Association of Science and Mathematics Teachers was held at the Case School of Applied Science and the Technical High School, Cleveland, November 25-26, 1910.

At the general sessions addresses were given by Dr. Dayton C. Miller, Case School of Applied Science, on "Sound Waves—Their Meaning, Registration and Analysis, with Demonstrations;" and by Dr. Harvey W. Wiley, chief chemist U. S. Department of Agriculture, Washington, D. C., on "Food Facts Which Every Citizen Should Know." Also valuable reports were presented by the Committee on "Fundamentals Common to the Various Sciences and Mathematics," the Committee on "Co-operative Experiments in Teaching Science," and the Committee on "The Relation of Elementary School Nature Study to Secondary School Science."

Among the resolutions adopted by the association were the following:

"That this association should encourage the carrying out of experiments relative to the matter and method of instruction, and that the sections should collect and make available to their members approved methods of testing results, to the end that the resulting conclusions may be definite and reliable.

"That we should strive not only for the 'problem-solving' attitude on the part of the pupil, but, further, we should seek to stimulate him into the 'problem-raising' attitude, in order the better to gain the full enlistment of his powers.

"That we believe in the recognition and inclusion within our courses of the practical and applied aspects of the sciences, to insure the proper motivation of the work of the pupil, and to 'bring him quickly and surely to the point where he will respond soundly to really significant stimuli.'"

The next annual meeting will be held in Chicago.

## ABSTRACTS AND REVIEWS.

O. DECROLY AND (Mlle.) J. DEGAND. *La mesure de l'intelligence chez des enfants normaux d'après les tests de Mm. Binet et Simon: nouvelle contribution critique.* Archives de Psychologie, 9: January, 1910, 81-108.

It will be recalled that the publication of the 1905 series of graded tests for developmental diagnosis by Binet and Simon was followed by a valuable critique of these tests by Decroly and Degand. These latter authors have now performed a similar service for the 1908 series of Binet and Simon. This critique is based upon the application of the 65 tests to 45 normal children of both sexes, children of well-to-do Brussels families, and aged from 2 years 7 months to 12 years 8 months. Some 15 pages are given over to a detailed report of the outcome of each test. The general conclusions may be summarized in six propositions.

1. Certain tests are too simple for the age to which they are assigned. These are the 3-year test of pointing out parts of the body, the 4-year test of naming familiar objects, three 6-year tests, viz: elementary esthetic judgment, defining objects, and executing a triple commission (all of which Decroly and Degand place in the 3d year), the 8-year tests of naming four colors and of differentiating objects recalled in memory, the 9-year test of arrangement of five weights, the first of the two 10-year tests of problem questions, and the two 11-year tests of detecting absurd statements and naming 60 words in 3 minutes.

2. Certain tests are too difficult for the age to which they are assigned. These are three tests—drawing from a cutting, juxtaposed triangles, and the distinction of abstract terms—all of which belong, according to Binet and Simon, in the 13th year.

3. Certain tests are too 'mechanical,' in that they call forth a quasi-automatic form of response, and do not compel the display of real intellectual ability. These are the four tests: Counting four pennies (5th year), counting 13 pennies (7th year), reciting the days of the week (9th year), and reciting the months of the year (10th year).

Decroly and Degand propose to modify the two last-named tests by requiring the child to recite the days or months backward, or to name the day or the month before a given day or month.

4. Certain tests are too 'schooly' (*trop scolaire*), i. e., they depend to some extent upon information or capacities acquired in schoolroom training, or upon chance training in the home, and not solely upon native ability. These are: Knowing the family name (3d year), knowing own age (6th year), counting the fingers, writing from copy, and naming four coins (7th year), reading and report, counting money, counting backward, writing from dictation (8th year), and, for some children at least, reading and report in the 9th year.

5. The rote memory tests (for digits and for sentences) should be graded to supply norms of performance between the age of 7 and the age of 12, which are now lacking.

6. The sentence-building tests (10th and 11th year) would be more valuable if they were so modified as to permit verbal execution within a prescribed time-limit.

To the reviewer, these criticisms all appear justifiable. It is to be hoped that before long we shall have a report from some American investigator that shall give us standards of performance for normal children in this country, both for the 1905 and the 1908 Binet-Simon series.

G. M. W.

KARL GROOS. *Das Seelenleben des Kindes. Ausgewählte Vorlesungen.* (Berlin: Reuther & Reichard, 1908. Pp. 260. M. 3.60. Geb., M. 4.50.)

The author calls this book "selected lectures," and explains that it is by no means an exhaustive, systematic treatise on the mental life of the child, but that certain aspects of child psychology receive fuller and more detailed treatment than would be possible in a systematic work of equal length. The work opens with an introductory discussion of fundamental concepts, followed by a brief outline of the aims of child psychology and a consideration of the methods of observation. Chapters IV and V, on the analysis of experience and on intention, have no specific connection with child psychology. They are, rather, general disquisitions on the nature of mind, with particular reference to Baldwin's genetic logic and the epistemological views of Meinong and Husserl. With the sixth chapter, on inherited

and acquired reactions, we get nearer our subject, but the relation between these two types of reaction is only touched upon with the mention of two fundamental points: (1) That every acquired reaction goes back directly or indirectly to an inherited basis, and (2) that by repetition acquired reactions become as mechanical and automatic as inherited reflexes.

In the chapter on play the author defends his well-known view that play is a preparation for the more serious activities of later life, and shows how this view grows out of and supplements Spencer's surplus energy theory. G. Stanley Hall's recapitulation theory of play is rejected as too far-fetched. A large part of the chapter is devoted to the consideration of Carr's work on *The Survival Values of Play*, with special reference to Carr's critique of the author's views.

The chapter on association contains, along with much general matter, an excellent summary of Ziehen's experiments on the associations of children and an account of some interesting experiments by the author. Students, trained in introspection, were tested to determine their mental reaction to statements that were obviously untrue. By far the larger number reported a visual image of an object contradictory to the statement. Another large class mentioned a contradictory verbal image. In two cases there was agreement with the false statement.

In the survey of recent experimental work on memory Meumann's conclusion that adults learn more readily than children is qualified by the observation that the experimenters have usually employed nonsense syllables—a kind of material that is highly uninteresting to the child and requires great effort of will on the part of the learner. If material within the range of children's interests were chosen, the results might be different. Emphasis is laid on the greater retentiveness of the child—a phenomenon which, in the reviewer's opinion, may also depend on the limited interests and mental activities of children. In the discussion of ideational types Lay's investigation on spelling is reported. Lay found that when the children had previously copied the words, they made only one-sixth as many mistakes as when they wrote from dictation, and one-fourth as many as when they had merely seen the words.

In the chapter on illusions of memory the work of Henri and Binet, Lony, and Stern is described in detail, and the topics of suggestibility in school children and the psychology of questioning are briefly discussed. In the attempt to describe the very large, the very small, or the exceptionally striking object, the child instinctively grasps at exaggeration. In this he is like the primitive adult, and the instinctive desire to make a great impression on an auditor is the fertile soil from which develop many children's lies and many myths and religious beliefs of savages. The problem of the proper training and development of children's imaginations is one of the most important and difficult questions with which we are confronted in our schools.

The latter part of the book, dealing with apperception, recognition, conception, judgment and reasoning, is somewhat disappointing, in that the author drifts into discussions of a philosophical and logical nature. Indeed, such a criticism might justly be made of the book as a whole. One might almost say that it is a course of lectures on general psychology and the philosophy of mind, enriched with a fairly large number of illustrations drawn from child psychology.

J. C. B.

MAX OFFNER. *Das Gedächtnis*. (Berlin: Reuther & Reichard, 1909. Pp. x, 238. M. 3.)

It is evident that the general problem of memory has not lacked experimental investigation when the names of Ebbinghaus, Müller, Külpe and Meumann and their respective students are so inseparably connected with it; yet Professor Offner has met a real need in bringing together in one very well-written volume the results of many researches. He wishes to give a *Gesamtbild* of the psychology of memory. To that end he has omitted almost all controversial discussion and has given a serviceable presentation of facts. For detailed treatment the general subject is divided into the following nine sections: The place of memory in the psychological system; perception and imagination; the concept of tendency or disposition; association; strength of disposition (liability to recall); stimulation and efficiency of the disposition (reproduction); individual and sexual differences in memory; memory of age, improvement and decline of memory; memory and intelligence, value of remembering

and forgetting. There are some 575 citations from over 200 different contributors. Since so many others are available, there is no attempt to make the appended bibliography complete, only about 180 titles being given.

There is very little that is actually new in the book, but in reading it one has a conviction that it is not necessary for most purposes to go one's self to the original sources. The facts are there. One does wish, however, that more of a discussion of the physiological aspects of memory had been included.

MABEL CLARE WILLIAMS.

University of Iowa.

E. H. HALL. *The Teaching of Elementary Physics.* Science. 32: No. 813, July 29, 1910. Pp. 129-146.

The student of general educational theory should find cause for gratification in the interest that teachers of science are evincing in the educational problems involved in their work. This is particularly noticeable in the fields of physics and zoölogy. Professor Hall's paper gives the consensus of opinion among sixty college and high-school physics teachers regarding certain problems and policies in the teaching of secondary-school physics. There seems to be a general agreement that the physics teacher for the secondary school should have a preparation equivalent at least to the ordinary college course plus one year's graduate work, thus qualifying himself for the Master's degree in physics. It is significant to note that only two out of the sixty teachers returning replies to Professor Hall's questionnaire advise devoting a part of this period of preparation to the professional study of educational problems. There is general agreement but very little enthusiasm regarding the proposal that lecture-demonstrations be given greater prominence in secondary-school physics. A very carefully-worded (and consequently rather obscure) proposition to the effect that the colleges should dictate as to what is "good practice" in secondary physics finds general agreement, although one teacher (himself a college professor) is brave enough to say that high schools must "serve their communities efficiently, and colleges must take their product and do their best with it." The recommendation that entrance examinations in physics include a laboratory test meets with a favorable response from the high-school teachers, although it is not so favorably received by the college physicists. Those who have been hoping

that secondary-school physics might rid itself of some of its quantitative difficulties, for the inclusion of which the Committee of Ten was largely responsible, will be disappointed that the proposal to omit the quantitative treatment of kinetics and the behavior of matter undergoing acceleration is not indorsed by these representative teachers of the subject.

W. C. B.

KATE GORDON, *Aesthetics*. (New York: Henry Holt and Company, 1909. Pp. 309.)

This text-book presents a clear and simple statement of the elements of aesthetics from the experimental point of view. After an introduction on imagination, feeling, and rhythm, chapters follow on the dance, music, color, lines, design, architecture, sculpture, painting, poetry, drama, and prose; also on the origin of art and the general conception of beauty. It represents a relatively new field in applied psychology, is well written and will do much to popularize the subject of aesthetics which has been woefully neglected in the training of teachers.

C. E. S.



## NOTES AND NEWS.

The editors of this JOURNAL desire to render its columns of the greatest possible service to practical educators. Some months ago the section on "Publications Received" was enlarged, so that a brief, concise description now accompanies the notice of each book. In order to keep our readers in still closer touch with current thought pertaining to educational psychology, we are establishing in the present issue another, similar section, entitled "Current Periodicals." In these two sections we purpose to give, within a reasonably short time after their appearance, a brief notice of every important book and magazine article bearing upon educational psychology.

The "Communications and Discussions" section offers a forum for the discussion of educational topics, of which we invite our readers to make liberal use. Under "Notes and News" we shall continue to furnish brief comments on psychological and educational movements.

J. C. B.

We note in the daily press that the Russian Duma has under consideration a bill providing for universal free primary education. The bill stipulates that instruction is to be given on 180 days of the year in cities and 160 days in the country districts. Teaching is to be conducted in the Russian language, with the exception that in the districts where the majority of the population use other language the teaching may be conducted in the language of the majority during the first two years of instruction, or for a longer period by special enactment in regard to each region or nationality. The bill seems likely to prove a most vital and far-reaching measure.

The annual high-school conference of the State of Illinois met in a three-days' session on November 19 at the State University. This is a working conference, at which experiences of the previous year are reported and discussed, and plans for the future are formulated. The attendance has increased during the past seven years from 75 to 780, and the number of sections from 3—English, biology and the physical sciences—to 12. The conference is working out a well-defined plan through a series of years, and is exerting a marked influence for the improvement of high-school work in Illinois.

The Teachers' Association of Basel has taken the initiative in honoring the memory of Pestalozzi by purchasing the farm of Neuhof, which recalls one of the most important phases in the life of the illustrious educator. It is proposed to establish an agricultural school and colony (Schweizerisches Pestalozziheim). The executive committee has already raised over half the money necessary for the establishment of this appropriate memorial.

In America we are pretty familiar with mothers' meetings and mothers' clubs actively interested in the work of the schools. Many of these movements have been started by the school authorities, and the support and co-operation of parents is welcomed and encouraged. In France we find the educational world much excited over the organization of fathers' associations, and the school authorities are bitter in their opposition. As a reason for this opposition it is alleged that the associations are an attempt on the part of the Roman Catholic party to dominate the secular schools. Prof. G. Compayré in the current number of *L'Educateur Moderne* takes a conciliatory attitude, and points out the good such associations might accomplish in strengthening the authority of the teachers.

For the past three years the Rochester (N. Y.) Dental Association has conducted a clinic for public-school children, and has published literature with a view to the education of the public as to the importance of dental hygiene in the schools. Less than a year ago, for the first time in this country, a full dental equipment and clinic was established in a school building. Within a few weeks two other clinics similarly equipped will be established in school buildings under the direction of the Rochester Dental Association. Their campaign of education recently culminated in two weeks of lectures by Dr. Corley of Tennessee and in a mass-meeting held in Convention Hall, at which eminent speakers from abroad were present. With the co-operation of the city health officer, the Dental Association and the public-school authorities, plans are being made for careful experiment to determine the effect of improved dental hygiene upon the school work of pupils. Dr. George W. Goler, city health officer, and in charge of the medical examiners for schools, will act as chairman of the committee to carry out this experiment. It is hoped to conduct the experiment under such test conditions as will make a contribution in the way of exact knowledge.

At the request of Professor Robertson of the Cortland (N. Y.) State Normal School, the Dental Association of that city recently deputed representatives to examine the condition of the teeth of the children in the training school. The examination showed that of these children, who are largely of American parentage and from homes of at least average grade, 92.86 per cent. needed some dental attention, 68.28 per cent. needed to have teeth filled, while 21.42 per cent. were suffering from abscessed teeth. Many had already lost teeth from their second dentition. These records are now being brought into relation with the school records to see whether any relationship can be detected between the hygienic condition of the mouth and the progress of the child in the school.

The New York Child Welfare Committee announces the opening at 31st street and Park avenue on January 18, 1911, of a child-welfare exhibit that "will give a vivid and comprehensive picture of child life in the city of New York." The exhibit will be based upon the labors of numerous subcommittees deputed to deal with homes, recreation and amusements, streets, libraries and museums, schools, health, social settlements, associations and clubs, churches, temples and Sunday-schools, public and private philanthropy, laws and administration, and work and wages. The promoters of this interesting exhibit believe that "it will demonstrate the economy of concentrating efforts for human betterment upon the children of today, and so lessening the social waste and financial burden of the charities and reformatories of tomorrow."

It gives us pleasure to call the attention of our readers to the *Training College Record* (London), a new monthly journal published by Longmans, Green & Co. for the Training College Association of Great Britain, and devoted to the interests of teachers in training. Prof. J. A. Green, The University, Sheffield, has consented to act as editor, and it is proposed to add to the title the words "Journal of Experimental Pedagogy." The November number contains, among other interesting material, an article by Winifred Hindshaw on "A Class Experiment on Attention," directly inspired by Professor Seashore's article and Dr. Geissler's abstract in the first number of this JOURNAL. The problem chosen was, "What is the effect of distractions upon the rate of reading and adding?" Six forms of distractions were tried, and the results show that adding is much more seriously affected by distraction than reading. The most effective type of distraction was dictating softly aloud. Miss Katharine L.

Johnston of Sheffield University has a 25-page article on the Binet tests.

We have received an announcement of *The Child*, a monthly journal devoted to child welfare, edited by T. N. Kelynack, M. D., published by John Bale, Sons & Danielson, London. Annual subscription, one guinea, or \$5.25. "The object of *The Child* is to provide an authoritative and representative journal for the collection and interpretation of all subjects relating to child life. It seeks to serve as a sort of clearing-house for the ready transfer and exchange of reliable information concerning truths relating to childhood, and it will constitute a form of institute for child welfare." Among the contributors we note the names of G. Stanley Hall and Leonard P. Ayres.

At the Third International Congress on School Hygiene, held at Paris August 2-7, 1910, an International Society for School Hygiene was formed, the aim of which shall be, in conjunction with the International Congresses on School Hygiene, to promote and support all movements connected with international school hygiene, and to further and strengthen the personal relations of those interested in the work. The affairs of the society will be conducted by the international permanent committee, of which Prof. Wm. H. Burnham, Clark University; Dr. Thomas F. Harrington, Boston Public Schools; Prof. R. Tait McKenzie, University of Pennsylvania, and Prof. Thomas A. Storey, College of the City of New York, are the American members. All transactions of the society will be published in the *International Journal of School Hygiene*, a quarterly magazine containing about 640 pages. The annual membership dues have been fixed at 50 cents and the subscription to the *Journal* at \$2.50.

The authorities of the Johns Hopkins University announce that a summer session of six weeks will be held at the university from July 5 to August 16, 1911. The work is designed primarily to meet the personal and professional needs of teachers. The instructors will be selected because of their marked ability as teachers and their interest in the special problems which confront the teachers in our schools. The management of the summer school will be under the direction of Prof. Edward F. Buchner, to whom inquiries for information may be addressed.

At the recent meeting in Boston of the New England Association of College Teachers of Education, Prof. Anna J. McKeag of Wellesley College was elected president.

A new 60-hour course in child study is being given for the benefit of teachers by Dr. Paul R. Radosavljevich of New York University on Saturdays from 1.15 to 3.15. This will supplement the courses in experimental pedagogy and the anthropological study of school children, which are given by the same instructor.

Dr. Eleanor H. Rowland, associate professor of philosophy and psychology at Mt. Holyoke College, spent six weeks of the summer at the New York State Reformatory for Women at Bedford. She carried out psychological tests, mainly upon backward girls, for the purpose of determining, if possible, a method of classification that may be useful to the administration in placing these girls when their terms of commitment expire.—*New York Evening Post*.

The Beer lectureship in political science at Columbia University will be filled this year by Leonard T. Hobhouse, professor of sociology in the University of London, well known for his works on "Mind in Evolution" and "Morals in Evolution." There will be a series of 10 lectures on "Social Evolution and Political Theory" during March and April.

At the University of Pennsylvania Dr. Arthur Holmes and Dr. F. M. Urban have been advanced to assistant professorships, and Mr. S. F. Fernberger to an instructorship in psychology.

Dr. John Franklin Brown, formerly professor of education in the University of Iowa, has been appointed lecturer in secondary education to graduate students at Wellesley College.

At Fisk University plans for the department of economics and sociology now include courses in methods of research, with a first-hand study of conditions among the colored people of the community. Dr. George Edmund Haynes has been appointed associate professor of social science to develop this work.

## CURRENT PERIODICALS.

(In this section only such articles will be noticed as bear directly or indirectly upon the interests of this Journal.)

PSYCHOLOGICAL REVIEW. Vol. XVII. January, 1910. JOHN A. BERGSTRÖM. *Pendulum Chronoscopes and Accessories for Psychological Experimentation*. 1-18. Figures and describes the latest pattern of pendulum chronoscope, also an accompanying mirror key, exposure apparatus, face key, touch key and sounder. DANIEL STARCH. *Mental Processes and Concomitant Galvanometric Changes*. 19-36. No changes occur during passivity, only small changes during quiet, though effortful mental activity, while large changes accompany characteristically those mental processes, especially emotions, that entail distinct physiological activity. HELEN THOMPSON WOOLLEY. *The Development of Right-Handedness in a Normal Infant*. 37-41. Reviewed in this JOURNAL, Vol. I, p. 418.—March, 1910. C. H. JUDD. *Evolution and Consciousness*. 77-97. The presidential address of the 1909 meeting of the American Psychological Association. Argues that "consciousness is a product of evolution which continues in a higher form the movement which is manifest in all earlier adaptations," radically modifies subsequent adaptation, and which needs thoroughgoing study if any scientific explanation of human life is to be attained. BORIS SIDIS. *The Nature and Causation of the Galvanic Phenomenon*. 98-146. "We may say, then, that all our experiments prove incontestably that the galvanic phenomenon is due to an electromotive force which is muscular in origin." WALTER D. SCOTT. *Personal Differences in Suggestibility*. 147-154. Reviewed in this JOURNAL, Vol. I, p. 420.—May, 1910. JUNE E. DOWNEY. *Judgments on the Sex of Handwriting*. 205-216. "It is possible to determine sex from handwriting in perhaps eighty cases out of a hundred." M. LEROY BILLINGS and JOHN F. SHEPARD. *The Change of Heart Rate with Attention*. 217-228. Auditory attention, visual attention and "central" attention (mental problems) have different, though fairly defined, effects on rate and amplitude of heart beat and on rate and amplitude of breathing.—July, 1910. GRACE MILDRED JONES. *Experiments on the Reproduction of Distance as Influenced by Suggestions of Ability and Inability*. 269-278. "The suggestion of ability produced generally less error and less variability than did the suggestion of inability, and estimates with no suggestion were in each case nearer the standard." EDW. K. STRONG, JR. *The Effect of Various Types of Suggestion Upon Mus-*

*cular Activity.* 279-293. Suggestions of "now you are strong" or "now you are weak," given to subjects during tests of maximal strength of hand, showed practically no superiority of the one over the other.—November, 1910. W. F. BOOK. *On the Genesis and Development of Conscious Attitudes (Bewusstseinslagen).* 381-398. Refers to his earlier experiments in the learning of typewriting to establish the thesis that the controversy concerning "imageless thought," conscious attitudes, or "non-sensory" processes may be satisfactorily resolved by viewing such processes as the resultants of earlier representative processes "boiled down" by practice and use.

THE JOURNAL OF PHILOSOPHY, PSYCHOLOGY AND SCIENTIFIC METHODS. Vol. VII. January 6, 1910. WILLIAM BROWN. *Educational Psychology in the Secondary School.* 14-18. This paper, read before the British Psychological Society, outlines a program of investigation which would bring experimental psychology into closer connection with the work of English secondary schools.—March 3, 1910. ROBERT M. YERKES. *Psychology in Its Relations to Biology.* 113-124. Deplores the confusion caused by the prevalent practice of mixing physics and physiology with psychology, advocates better training in scientific method as a preparation for psychology, and urges that psychology take its stand upon its own postulates and work out causal relationships in its own field.—March 31, 1910. GEORGE H. MEAD. *What Social Objects Must Psychology Presuppose?* 174-180. "Experience in its original form became reflective in the recognition of selves, and only gradually was there differentiated a reflective experience of things which were purely physical." E. B. TITCHENER. *Attention as Sensory Clearness.* 180-182. Woodworth's paradox, that "to reach a distinction between the clear and the unclear each of them must receive some measure of attention; but the unclear is just that which is not attended to, and this precludes the making of the distinction," is shown to be due only to a confusion in the form of statement of the problem.—April 14, 1910. WALTER B. PITKIN. *Some Neglected Paradoxes of Visual Space.* IV. 204-215. An appeal to the simple reflexes and primitive visual behavior of childhood forces even the idealistic biologist to a realistic conception of space.—May 26, 1910. ARCHIBALD ALEXANDER. *The Paradox of Voluntary Attention.* 291-298. "I conclude that neither in the recall of an idea nor in fixing an idea which has been recalled is it possible to prove that will as a special psychical process has any part."—June 9, 1910. FRANCIS B. SUMNER. *The Science and Philosophy of the Organism.* 309-330. An extended critical review of Driesch's neo-vitalism which is of great value for all biological psychologists.—July 7, 1910. JOSEPH JASTROW. *The Physiological Support of the Perceptive Processes.* 380-385. The suggestive or psychological factors are of greater importance than the physiological ones in estimating the distance of

points of light.—August 4, 1910. IRVING KING. *The Problem and Content of Educational Psychology*. 428-436. A brief account of the rise and present status of educational psychology, followed by the outline of a course which shall be neither pure descriptive psychology nor experimental pedagogy, but shall consider the various phases of the learning process from a psychological point of view.—August 18, 1910. H. L. HOLLINGWORTH. *The Central Tendency of Judgment*. 461-469. An experimental study of the indifference point in the error of judgments on the length of lines.—September 15, 1910. WILLIAM BROWN. *Note on a Quantitative Analysis of Mathematical Intelligence*. 526-528. See this JOURNAL, Vol. I, p. 545.—September 29, 1910. ALFRED H. LLOYD. *The Passing of the Supernatural*. 533-553. The basis of religion is shifting from the supernatural to the scientific, largely on account of the recognition of natural law in mental activity.—November 24, 1910. D. S. MILLER. *Some of the Tendencies of Professor James' Work*. 645-664. A warm-hearted appreciation of James as the doctor, the artist and the sympathetic human being.

SCHOOL HYGIENE (London). Vol. I. January, 1910. H. GRIESBACH, LAUDER BRUNTON AND A. MATHIEU. *Co-operation in Education*. 10-13. A plea for international co-operation in physical education made by the presidents of the three international congresses on school hygiene, 1904, 1907 and 1910. JAMES KERR. *Elementary Schools and Tuberculosis*. 14-20. Quotes Hamburger to the effect that tuberculosis is "a true children's disease. Just as everybody goes through measles, so we can say today almost everyone acquires tuberculosis some time, and mostly during the years of childhood." Hence the necessity of hygienic conditions for school children. C. EDWARD WALLACE. *Recent Progress in School Dental Hygiene*. 44-46. A brief report on German dental clinics.—February, 1910. MACLEOD YEARSLEY. *The Ear and Nose in School Medical Inspection*. 84-92. "All children should be examined as regards their hearing in the first year of school life."—March, 1910. THOMAS GARBUTT. *The Half-Time Question*. 157-169. "I am of the opinion that the system, as a system, is bad, (1) for the home life of the community, (2) from the educational standpoint, (3) from the economic standpoint, (4) for the general welfare of the community."—May, 1910. GLADYS W. MARTYN. *The Experimental Study of Mental Fatigue*. 280-284. (Also June, 1910, 314-321, and October, 1910, 562-574.) Deals in a rather general way with the results of experimental studies, and in Part II gives a more detailed account of psychological and psycho-physical tests.—June, 1910. R. C. ELMSLIE. *School Provision for Physically Defective Children*. 322-334. Tuberculous children are three times as numerous as any other class of physical defectives. L. A. PARRY. *Some Points of Interest Revealed by the Medical Inspection of 2000 School Children*. 335-340. School



children in the borough of Hove show a rather high percentage of infectious diseases, decayed teeth and ringworm, but little tuberculosis and less mental deficiency.—July, 1910. FRANK C. SHRUBSALL. *Some Notes on Anthropometric Measurements and Their Interpretation*. 380-390. A comparison of methods and tabulations.—August, 1910. MARGARET McMILLAN. *Speech Defects and Speech Training*. 434-437. Report of a number of interesting cases. N. BISHOP HARMAN. *The Eyes and Vision of School Children*. 438-455. A valuable survey of the subject, containing a report on some original investigations.—September, 1910. JAMES KERR. *The Doctor's Work in the Schools*. 495-501. A school doctor has two aims—(1) raising the general standard of public health, and (2) detecting defects in the individual children with a view to remedying them. MARTIN CHOTZEN. *Instruction on Sex*. 502-508. Thinks that most of the instruction should be given in the home, that the school should approach the subject only indirectly, and that there should be special provision made to show parents the best way of giving this instruction.—October, 1910. VERE SCOT. *The School Dens of Ireland*. 543-557. A vivid and well-authenticated picture of a most distressing situation. One can imagine the condition of 80 children in a tumble-down room of less than 14 by 24 feet. JAMES KERR. *German Education at the Brussels Exhibition*. 575-580. Gives a good survey of some of the most recent improvements in German school hygiene.

SCHOOL REVIEW. Vol. XVIII, 9. November, 1910. P. SHOREY. *The Case for the Classics*. 585-617. Latin is not only valuable, but absolutely essential as a mental discipline. Greek is the first of the luxuries. The results of experiments on the transfer of training are laughed out of court. "There are in general no laboratory experiments that teach us anything about the higher mental processes which we cannot observe and infer by better and more natural methods." A. D. SHEFFIELD. *The Rational Study of English Grammar*. 618-626. A strong and consistent plea for the recognition in the study of English grammar of the principles of modern psychology and logic. J. L. MERRIAM. *Recitation and Study*. 627-633. Arguments and suggestions for utilizing the recitation period in part for the purposes of instruction in the art of study.

## PUBLICATIONS RECEIVED TO DECEMBER 1, 1910.

(Notice in this section does not preclude a more extended review.)

EDWARD SCRIBNER AMES. *The Psychology of Religious Experience*. Boston and New York: Houghton-Mifflin Company, 1910. \$2.50.

An excellent psychological treatise dealing with the history and methods of the psychology of religion, the origin of religion in the race, the rise of religion in the individual, and the place of religion in the experience of the individual and society. This book is of fundamental and lasting value as an interpretation of the facts up to date, and contains original contributions.

LEONARD P. AYRES. *Open-Air Schools*. New York: Doubleday, Page & Co., 1910. Pp. 156.

This little book pictures and describes the open-air schools which have been established in Germany, England and this country as educational experiments in the last few years. The experiments are universally counted successful, and the plan is sure to be adopted extensively for weak children. The moral of the book is this: If fresh air is so good for sick children even in midwinter, why not give it in abundance to the child in health? For this reason teachers and parents should know this book.

FREDERICK ELMER BOLTON. *Principles of Education*. New York: Charles Scribner's Sons, 1910. Pp. 781. \$3.

This book will receive extended notice later.

FREDERICK G. BONSER, Ph. D. *The Reasoning Ability of Children of the Fourth, Fifth and Sixth School Grades*. New York: Teachers College, Columbia University, 1910. Pp. vii, 133. Cloth, \$1.50.

A very interesting and important study of the reasoning process under school conditions. Four aspects of reasoning were tested: Mathematical judgment, controlled association, selective judgment as shown in checking reasons for a statement, and literary interpretation of a stanza of poetry as indicated by writing the meaning in prose. The results demonstrate the possibility of measuring reasoning abilities quite accurately. In certain tests the boys were definitely superior to the girls, in others the girls quite as definitely superior to the boys. Many individuals from the lower-grade groups,

as well as from the lower-age groups, were found in the highest quartile. "Perhaps the worst type of retardation in the schools is withholding appropriate promotion from those pupils who are the most gifted, therefore of most significance as social capital."

*British Association. Anthropometric Investigation in the British Isles.* (Report of the Committee on Anthropometric Method.) London: Royal Anthropological Institute, 1909. Pp. 57. 1s. net.

Includes detailed and illustrated directions for measurements of the cranium, the face, the nose, the ear, the upper limbs, the trunk, the lower limbs, span of arms, weight, teeth and finger prints. Classifications of the color of the hair and eyes are given, brief physiological and psychological tests are indicated, and attention is called to important factors of the environment.

W. E. CHANCELLOR. *Class Teaching and Management.* New York: Harper & Bros., 1910. Pp. xiv, 343. \$1.

Superintendent Chancellor has led us to expect from him books that are easy and interesting to read. The present volume is no exception to this rule. The author believes that classroom teaching in the United States is standardized in three forms—district-school teaching, graded-school teaching and departmental teaching. His book is an exposition of these three standards.

ED. CLAPAREDE, Editor. *VII<sup>me</sup>. Congrès International de Psychologie, tenu à Genève du 2 au 7 Août, 1909. Rapports et Comptes Rendus.* Genève: Librairie Kündig, 1910. Pp. 877. 20 fr.

This volume gives a bird's-eye view of present activities in the world of psychology. Of special interest to educators are the discussion of the subconscious by Dessoir, Janet and Morton Prince; the symposium on the classification of retarded pupils by Decroly, Heller, Ferrari and Persigout, and the paper on pedagogical psychology by Ioteyko. Among the short papers may be mentioned: Andrade, "The Psychology of Education;" Hoesch-Ernst, "Youthful Genius;" Jones, "The Difference Between Sexes in the Development of Speech;" Max Meyer, "Students' Marks;" Nayrac, "Measures of Attention;" De Sanctis, "Application of the Binet Scale;" Schuyten, "Mental Classification of Normal Pupils;" Wesszely, "Contributions to Individual Psychology."

JOSEPH VILLIERS DENNEY, CARSON S. DUNCAN AND FRANK C. MCKINNEY. *Argumentation and Debate.* New York: American Book Co., 1910. Pp. 400. \$1.25.

This book contains a brief discussion of fundamental principles, appropriate suggested exercises, and nearly 300 pages of master-

pieces of complete debates on important questions which have agitated this country. Its aim is to set forth clearly and concisely the principles of argumentation, and at the same time to supply a proper amount of such material for the study of debating as has been employed by able men in the defense of great principles.

ALBERT GEHRING. *The Basis of Musical Pleasure*. New York: G. P. Putnam's Sons, 1910. Pp. 196.

This book will receive notice later.

ADALBERT GREGOR. *Leitfaden der experimentellen Psycho-pathologie*. Berlin: S. Karger, 1910. Pp. x, 222.

Probably the most complete and most serviceable work on psychopathology in existence. The 16 lectures treat of such topics as psychopathology of the time sense; reaction experiments; pathology of perception, of association, of memory; the psychology and pathology of testimony, of attention, of volition; speech defects; mental work under normal and abnormal conditions, and methods of investigating intelligence. Under each topic the author gives a concise summary of work done by other investigators, and in many cases supplements this by valuable observations from his own researches. Students of defectives will find this book of great value.

ALFRED C. HADDON, M. A., Sc. D., F. R. S. *History of Anthropology*. London: Watts & Co., 1910. Pp. x, 158. 1s. net.

A brief, popular, but accurate survey of the history of the science of man. Part I, Physical Anthropology, deals with the pioneers and systematizers, controversies on the origin of man, the antiquity of man, comparative psychology, and the classification and distribution of man. Part II, Cultural Anthropology, or Ethnology, discusses archeological discovery, sociology and religion, linguistics, and cultural classification.

MARY HIGGS. *The Evolution of the Child Mind*. London: The Froebel Society of Great Britain and Ireland, 1910. Pp. 67.

Three somewhat superficial papers on child psychology, the moral development of the child, and the home and the school. Moral development is traced in vague fashion through four stages—the unmoral, the imitative, the personal and the altruistic. The author seems to suffer from over-earnestness.

FRANK ALONZO HILDEBRAND. *The Dynamic School of Tomorrow: Rationalism in Teaching the Aesthetic Element in Education*. New York: Aberdeen Publishing Co., 1910. Pp. 395.

This is a collection of material, with suggestions of method, planned for use by the "mass" of untrained teachers in grade schools,

and prefaced by some heterogeneous chapters of a "teachers' institute" type of presentation, dealing with the "dynamic" teacher, the value of interest, social functions, discipline, etc. The preface states that "it has not always been easy to make the purpose of the author clear." So far as the introductory sections are concerned, we agree with this statement. The grade teacher who scans the type lessons in American history, geography, etc., and who reads the chapters on myths, artists and their pictures, nature study, arithmetic, school songs, the school library, the school museum, etc., may fare better.

BERNARD HOLLANDER, *M. D.* *Hypnotism and Suggestion in Daily Life, Education and Medical Practice.* New York: G. P. Putnam's Sons, 1910. Pp. xii, 295. \$1.75 net.

A book intended for popular consumption, treating of suggestion, hypnosis, clairvoyance, thought-transference, apparitions, mesmerism and suggestive therapeutics. The comments of Dr. Goddard in our April (1910) issue anent Winbigler's book on suggestion apply, in principle, equally well to the present treatment. The underlying psychology is most naive, and we cannot recommend the volume.

LE G. KERR. *The Care and Training of Children.* New York: Funk & Wagnalls Company, 1910. Pp. xvi, 233. 75c.

This book is primarily addressed to parents, and aims to acquaint them with the facts and principles concerning child life and development that are essential to the successful outcome of the nurture of the home. The book is written in a clear and simple style, and is replete with wholesome advice upon many topics, ranging from the light, ventilation and temperature of the child's room to the time, conditions and methods of enlightening him upon the subject of sex.

*Lectures and Addresses Delivered Before the Departments of Psychology and Pedagogy in Celebration of the Twentieth Anniversary of the Opening of Clark University.* Worcester, 1909.

This very valuable volume contains addresses by Freud, Jung, Stern, Jennings, Boas, Adolf Meyer, Titchener, Burgerstein, Storey, Whipple, Goddard, Paul Monroe, Balliet, Miss McKeag, Buchner and W. S. Small. The addresses of the German speakers are translated by H. W. Chase, A. A. Brill and E. C. Sanford. These are especially valuable in furnishing a bird's-eye view of the important work in psycho-analysis and differential psychology.

L. LÉVY-BRUHL. *Les fonctions mentales dans les sociétés inférieures.* Paris: F. Alcan, 1910. Pp. 461. 7.50 fr.

A fascinating and scholarly book. One of the most important contributions of recent times to the psychological analysis of the primi-

tive social consciousness. Part I discusses collective ideas in their mystical aspect, the law of participation and the activities of the prelogical mind. Part II deals with primitive mind in connection with spoken language and the development of arithmetical conceptions. Part III treats of collective ideas in such forms of activity as hunting, fishing, and ceremonies connected with war and natural phenomena. Part IV sketches the transition to higher types of mentality. The educator will find something of interest on almost every page.

EDITH B. LOWRY. *Confidences. Talks with a Young Girl Concerning Herself.* Chicago: Forbes & Co., 1910. Pp. 94. 50c.

"The author has tried to tell in suitable language the facts that should be known by every girl from 10 to 14 years of age. The book is of such a character that it may be placed in the hands of the young girl; but, better still, it may be read aloud by the mother to her daughter." A possible criticism would be that the style is somewhat too infantile for the age for which it is intended.

C. R. MANN AND G. R. TWISS. *Physics.* Chicago: Scott, Foresman & Co., 1910. Pp. x, 424.

From the point of view of contemporary educational doctrine, this book, which is intended for high-school pupils, is most admirably constructed. The authors have clearly analyzed their educational problem as well as their subject-matter. They believe that physics should give the pupil both a body of knowledge and training in scientific thinking. In the realization of both aims the problem interest is an important agency; consequently the problems are among the most important features of the book. The manner in which the various laws and principles are introduced merits especial praise. For the teacher of educational method who is seeking good models of exposition and illustration this feature of the book will prove invaluable. Both in the approach to principles and in the problem work the economic factor finds effective recognition.

THOMAS VERNER MOORE. *The Process of Abstraction.* University of California Publications in Psychology, Vol. II. November, 1910. 73-193.

An elaborate experimental study.

EDITH E. READ MUMFORD, M. A. *The Dawn of Character. A Study of Child Life.* New York: Longmans, Green & Co., 1910. Pp. 225. \$1.20 net.

An excellent popular treatment of the development of moral ideas in the child. The psychology is chiefly of the Sully type, but this is kept well in the background, and emphasis is laid on accurate obser-

vation and interpretation of child behavior. The chapter on "The Place of Punishment in Education" is particularly sane.

*New Jersey Training School for Feeble-Minded Girls and Boys. Twenty-second Annual Report, 1910. Pp. 103.*

This is not an ordinary perfunctory report, but an outline of one of the most beneficent and far-reaching campaigns for the study of the feeble-minded that has ever been undertaken. For years Superintendent Johnstone has been perfecting his plans and strengthening his resources, until he has gathered about him a most efficient staff, and has built up what is generally recognized as the model institution of its sort in America. Now he appeals to the public for support in carrying out a line of investigation which will be of tremendous importance in the education of normal as well as retarded children.

E. PEILLAUDE. *Les Images. Essai sur la mémoire et l'imagination.* Paris: Marcel Revière & Cie, 1910. Pp. 513. 9 fr.

Researches in the experimental and pathological psychology of memory and imagination. Part I deals with the analysis of images, including visual, auditory, motor, olfactory, gustatory, kinaesthetic and affective. Part II, the greater portion of the book, treats of the synthesis of images. The author discusses the evolution of images, the action of time on images, passive and active recall, defects in reproduction, unconscious memory, paramnesia, time and space in memory and the various aspects of invention, and concludes with a chapter devoted to the refutation of associationism as an explanation of the synthesis of images.

*Report of the Superintendent of Schools, Chicago, Ill., for the Year Ended June 30, 1910. Chicago: Board of Education, 1910. Pp. 81.*

Describes an interesting attempt to deal with speech defects in the elementary schools. Ten graduates from the Normal School were selected on account of their fitness for the work, and each was assigned a certain number of schools, where they devoted their whole time for six months to the correction of speech defects. Seventeen hundred and forty-four pupils were found thus defective, and so successful was the treatment that the plan is to be continued for another year.

CARL E. SEASHORE. *The Play Impulse and Attitude in Religion.* Reprinted from the *American Journal of Theology*, XIV, No. 4, October, 1910. 505-520.

"Those attitudes and experiences which we call play characterize a very large part of our religious experience, and the religion of

daily life shows itself most naturally in the moments of free self-expression."

- D. SNEDDEN. *The Problem of Vocational Education*. Boston: Houghton Mifflin Company, 1910. (Riverside Education Monographs.) Pp. vii, 86. 35c.

Dr. Snedden defines education as the resultant of a vital interaction between mind and its world. There are four important types of education—physical, vocational, social and cultural. The last two constitute the composite type, "liberal." Vocational education is older than liberal education; it is that form of education "whose controlling motive in choice of means and methods is to prepare for productive efficiency." Vocational education is ordinarily informal in its nature, but when the informal means become inadequate the institutions of formal education must undertake vocational responsibilities. Such conditions are brought about by the highly organized form of modern industry. The author maintains that the State can best control the institutions of vocational education. Among the other topics treated by Dr. Snedden are the Relation of Vocational Education to Manual Training, the Problems of Administration and Support, the Teaching Force, Agricultural Education, and the Relation of Vocational to Cultural Education.

- B. S. TALMEY. *Genesis*. New York: The Practitioners' Publishing Co., 1910. Pp. 176. \$1.50.

"A manual for the instruction of children in matters sexual—for the use of parents, teachers, physicians and ministers." It approaches the problem from the strictly scientific point of view, drawing illustrations from plant and animal life, and couches the graded instruction in technical language.



Peter Sandiford

## MENTAL FATIGUE.

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### SUMMARY.

Six subjects worked continuously from three to eight hours on the mental multiplication of one three-place number by another. Ten subjects worked from four to twelve hours with pauses for meals. All subjects did from a half-hour's to an hour's work on a following day. Only three out of the sixteen subjects did as well at the end of work as after rest. The greatest fatigue effect came after a work period of about five hours, the smallest (except in the three negative cases) after a work period of almost nine hours. The subjects who were most efficient and worked most rapidly showed a smaller loss through fatigue than did the less efficient workers. Inspection of the records shows that the results are probably a compound of a gradually decreasing practice effect with a gradually increasing fatigue effect. There seems to be little correlation between the fact of fatigue and the feeling of fatigue.

Through the kindness of some of my students I am able to report measurements of the change in the efficiency of a mental function in the course of several hours of continuous exercise of it without appreciable rest, or with only a short rest for luncheon.

The function in question was the mental multiplication of a three-place number by a three-place number, neither number having any 0's or 1's amongst the digits. These examples were type-written; the subject of the experiment looked at them and got the product in any way he chose, with the one condition that he must write nothing until he got the product. The function was thus identical with that described in the

author's paper on the *Effect of Practice in the Case of a Purely Intellectual Function* (Am. J. of Psy., July, '08; Vol. XIX, p. 374 ff.), except that in the present case the subject could always see the multiplier and multiplicand and did not, as in the experiment on practice, have to memorize them. This change was, I think, a mistake in method. It reduces the task of brute memory, but it adds apparently a severe tax upon the eyes and makes the function somewhat less worthy of the name "purely intellectual."

The subject recorded the time (to seconds or to the nearest 10-second point) of beginning an example. As soon as he got and recorded its product, he recorded the time and began on another example. Apart from these intermissions of a second or two to look at a watch and record the time, the work was substantially continuous.

Such work is, as anyone will find by attempting it, very exacting and fatiguing in the popular sense. It is also very hard both in the sense that many individuals cannot do it at all, and in the sense that those who can do the work experience in most cases pronounced feelings of strain or effort.

Six subjects worked with no rest except such very brief pauses as would naturally occur occasionally in any long-continued experiment—such are noted in Table 5—from 2 to nearly 8 hours, respectively. Nine subjects worked from 4 to over 12 hours, respectively, with rests for luncheon of from 24 to 98 minutes. One subject worked over six hours, but was compelled by circumstances to make a stop of over three hours. All the subjects did from a half hour's to an hour's work on the following or a later day.

The efficiency of the function is measured by the rapidity and accuracy of getting the products. The original measures are given in Table 5 at the end of this article, so that anyone may calculate from them any measurements desired. I give in Table 1 the essential gross scores. I reduce the results to a single measure for efficiency as follows: Call one digit wrong in a product, 2 errors; call any other digits wrong, each 1 error; for each such "error" add 12 per cent. of the time for one example. The penalty for an "error" was made larger than that given in the harder task of the investigation of

TABLE 1.

ESSENTIAL GROSS SCORES.

Individual.	Sex.	Length of work-period, in minutes.	Approximate time of beginning.	Length of rest-pause, in minutes.	During work period.					
					First four examples.		Second four examples.		Third four examples.	
					Time, in seconds.	Digits wrong. Examples wrong.	Time, in seconds.	Digits wrong. Examples wrong.	Time, in seconds.	Digits wrong. Examples wrong.
- 1	M	467	2 P. M.	0	2220	5 2	?		1350	5 4
2	F	428	6 A. M.	0	750	4 2	400	4 2	540	4 2
- 3	M	300	12 M.	0	1080	0 0	600	0 0	720	0 0
4	F	262	7 P. M.	0	1240	8 3	2180	3 2	1890	2 2
5	F	212	10 A. M.	0	790	12 4	570	9 4	700	12 4
6	F	121	9 A. M.	0	?		?		?	
- 7	M	734	6 A. M.	29	2340	7 4	2820	8 4	3240	8 4
- 8	M	490	9 A. M.	77	?		?		?	
9	F	460	2 P. M.	60	2465	8 4	2105	6 3	1525	5 2
10	F	432	12 M.	204	1100	7 3	540	4 3	570	2 2
11	F	420	2 P. M.	90	713	5 3	553	4 3	720	4 2
12	F	392	10 A. M.	45	1218	3 3	1327	9 3	1365	3 3
- 13	M	388	10 A. M.	52	4660	4 3	2210	2 2	1740	1 1
14	F	314	9 A. M.	98	900	0 0	840	0 0	780	8 3
15	F	240	3 P. M.	24	2040	2 2	2040	9 3	1650	4 3
- 16	M	240	4 P. M.	30	?		?		?	

A question mark means that interruptions or failures to record properly leave the times in doubt.

practice when the multiplier and multiplicand themselves had to be carried mentally. An "error" adds 12 per cent. instead of 10, and the error score is not the number of digits wrong, but that number plus the number of *examples* wrong. This system of combining speed and accuracy is arbitrary, as any system devised without elaborate experimentation must be. But it is not far wrong, and the conclusions of this paper will be found supported by the data under any rational equating of accuracy and speed.

TABLE 1 (continued).

## ESSENTIAL GROSS SCORES.

Individual.	During work-period.				After 16 or more hours of rest.							
	Next to last four examples.		Last four exam- ples.		First four examples.		Second four examples.		Third four examples.			
	Time, in seconds.	Digits wrong. Examples wrong.	Time, in seconds.	Digits wrong. Examples wrong.	Time, in seconds.	Digits wrong. Examples wrong.	Time, in seconds.	Digits wrong. Examples wrong.	Time, in seconds.	Digits wrong. Examples wrong.		
1	1330	1 1	1595	6 1	850	1 1	790	2 2	1430	12 3		
2	375	0 0	415	1 1	240	2 1	275	1 1	280	3 2		
3	840	1 1	690	2 2	360	0 0	240	0 0	390	0 0		
4	1540	5 3	1240	4 3	910	2 2	915	5 2	1165	5 3		
5	600	10 4	720	10 4	660	12 4	630	11 4	690	12 4		
6	760	13 4	1005	11 4	780	13 4	1050	11 4	660	14 4		
7	2520	8 3	2400	9 4	2100	8 3	2460	3 3				
8	505	6 3	640	3 2	460	2 2	425	2 2	490	0 0		
9	1235	11 4	1380	6 4	780	7 4	960	2 2	810	2 2		
10	280	5 3	260	4 3	225	2 1	255	1 1	240	2 2		
11	850	2 2	900	6 4	520	5 3	485	4 3	665	8 4		
12	1645	4 3	1733	12 4	1010	1 1	1115	0 0	1215	5 4		
13	760	4 2	760	3 2	330	4 2	320	1 1	265	2 2		
14	780	7 3	660	2 1	480	1 1	420	0 0	450	4 2		
15	720	2 1	807	7 4	465	3 2	885	2 1	900	4 2		
16	170	1 1	270	0 0	295	1 1	255	1 1	340	3 2		

The measures of efficiency at the end of the work-period and at the beginning of the period after rest, thus reduced to single figures, are given in Table 2. To Tables 1, 2 and 5 I refer the student for the evidence for, and more exact statement of, the conclusions which are stated summarily and somewhat superficially in the text.

## THE AMOUNT OF FATIGUE.

The influence of long exercise of a function with little or no rest upon the efficiency of the function is measured by the difference between the scores at the end of the work period

TABLE 2.

TIMES CORRECTED FOR ERRORS AT END OF WORK-PERIOD  
AND AFTER SIXTEEN HOURS OR MORE OF REST.

Individual.	Length of work-period, in minutes.	Length of rest-pause.	At end of work-period.		After 16 hours or more of rest.			
			Next to last four examples.	Last four examples.	First four examples.	Second four examples.	Third four examples.	Fourth four examples.
1	467	0	1302	1925	925	870	2080	
2	428	0	375	420	260	290	315	265
3	300	0	890	780	360	240	390	630
4	262	0	1920	1500	1020	1105	1450	1055
5	212	0	852	1020	980	900	1020	890
6	121	0	1140	1460	1120	1525	1020	
7	734	29	3360	3335	2790	3120		
8	490	77	635	735	515	475	490	440
9	460	60	1780	1795	1040	1075	910	1490
10	432	204	348	314	241	270	270	290
11	420	90	955	1170	645	590	900	710
12	392	45	1990	2560	1070	1115	1540	1670
13	388	52	920	872	390	340	295	375
14	314	98	1015	720	510	420	540	410
15	240	24	786	1075	536	965	1060	1020
16	240	30	177	270	313	270	391	218

and those at the beginning of the test on the following or a later, day, after rest.

For the score at the end of the work period I use the score of the last four examples done and also that of the next to the last four. The latter is preferable because, although the subjects were requested to decide beforehand the time for stopping work and neither stop before nor overrun that time, some of them stopped partly because of having made some exceedingly slow records. Thus some of the "last four" scores are not a random selection of achievements after a certain amount of work, but a selection of achievements so bad

as to lead one to think he cannot continue. On the other hand, subjects who followed the directions exactly may get reinforcement from the knowledge that the end of the task is at hand. The net result of these forces is slight. They make the "last four" score worse than the "next to the last four" score in 10 cases of the 16.

For the efficiency at the beginning of the work of the following day I use the score of the first four examples, the score of the second four, and the average of these two scores. Between the first and second four there is no observable difference in efficiency, but after eight examples are done on the following day, the work gets worse. The average of the scores for the first four and second four seems, therefore, the best single measure to use.

The per cent. which the time (with allowance for errors) required to do four examples at the end of the work-period is of that required at the beginning of work after the rest-period is given for each individual by each of the above methods of scoring in Table 3.

As was just stated, column 5 of Table 3 gives the most significant figures. In these we find that only 3 of the 16 individuals did apparently as well after the work as after the rest. Their work-periods were the shortest three of the sixteen. The variations in the amount of fatigue are very great, even if these three are left out of account. Three individuals require over twice the time per example after work as after rest, and one of these nearly thrice the time. The individual differences in general would remain nearly as great had all individuals worked, say seven hours, without rest, for the greatest fatigue effect comes from a rather short work-period (300 min., 0 rest), and the next greatest from a short period with a moderate rest (388 min., 52 min. rest), and one of the smallest fatigue effects (except the three negative cases) comes from a very long work-period with a very short rest (734 min., 29 min. rest.)

The individual differences singly are, however, not reliable enough to support arguments based on other than the large differences, or to be used for other than very rough correlations.

TABLE 3.

PERCENTAGES WHICH TIMES CORRECTED FOR ERRORS  
AT END OF WORK-PERIOD ARE OF THOSE AFTER  
SIXTEEN HOURS OR MORE OF REST.

Individual.	Length of work-period, in minutes.	Length of rest-pause within work-period.	1.	2.	3.	4.	5.	6.
			Using next to last four of work-period and first four examples after rest.	Using next to last four of work-period and second four examples after rest.	Using last four of work-period and first four examples after rest.	Using last four of work-period and second four examples after rest.	Using next to last four of work-period and first eight examples after rest.	Using last four of work-period and first eight examples after rest.
1	467	0	141	150	208	221	145	214
2	428	0	144	129	162	145	136	153
3	300	0	247	371	217	325	297	160
4	262	0	188	173	147	135	181	141
5	212	0	87	95	104	113	91	109
6	121	0	102	75	131	96	85	109
7	734	29	121	108	119	107	114	113
8	490	77	123	134	143	155	128	148
9	460	60	171	165	173	167	168	169
10	432	204	144	129	130	116	136	123
11	420	90	148	162	181	198	155	189
12	392	45	186	178	239	229	183	235
13	388	52	236	271	224	256	252	239
14	314	98	199	242	141	171	218	155
15	240	24	147	81	201	111	105	143
16	240	30	57	66	86	100	61	93

It is also unwise to try to combine the single results into a mass result to measure the central tendency of educated adults to fatigue in this function. The variations in the length of the working periods make the estimate of such a central tendency difficult, and it is not even sure that there is any

real central tendency. For the seven individuals who worked approximately 7 hours, the median ratio of the record at the end of the work-period to that at the beginning of the test after rest was 1.55. The corresponding average was 1.54. These figures are from the presumably best method of measurement. By the other five methods whose results are recorded in Table 3, the corresponding percents are: Medians, 144, 173, 150, 167 and 169; Averages, 151, 176, 150, 176 and 176.

In considering the percents showing the amount of fatigue, the reader will bear in mind the significance of time as a measure of efficiency in the function. For a person to be able to multiply mentally a three-place by a three-place number *at all* means a rather high degree of efficiency in the function. A great diminution in efficiency should make a person unable to remember one partial product while getting another. For one to take twice as long means to be half as efficient only in one special sense of "half as efficient."

The degree of difficulty that can or cannot be met is for many purposes a more satisfactory measure than the time required and the success attained in meeting one given degree of difficulty. With mental multiplication it is practicable, though very laborious, to make the former measurement by having interspersed, in and at the close of a rigidly fixed long work-period of mental multiplication with two three-place numbers, tests in multiplying a four-place by a three-place number, a four-place by a four-place, a five-place by a four-place, and a five-place by a five-place. There should also be tests with three-place by two-place, two-place by two-place, etc., in case an individual comes to fail utterly with the three-place by three-place multiplication.

#### FATIGUE IN RELATION TO QUALITY AND QUANTITY OF WORK.

The decreased efficiency shows itself in about the same percentile increase in errors as in time, but somewhat more in the errors. The increased efficiency in practice with mental multiplication shows itself similarly in about the same percentile decrease in both errors and time, but somewhat more in the time.



THE RELATION OF AMOUNT OF FATIGUE TO LENGTH OF WORK.

This relation cannot be measured properly from the data at hand. For the subjects did not work for equal lengths of time and almost certainly decided to stop to some extent because of the diminution in efficiency which existed or which they felt to exist. Consequently, the apparently very slight or even zero correspondence between length of work and amount of fatigue may not represent the real relation. Tests with the same individuals, each for varying lengths of time, are required.

THE RELATION OF AMOUNT OF FATIGUE TO ABILITY IN THE  
FUNCTION.

For certain practical purposes it is of some value to know whether the competent person, who achieves the most objectively in his work, loses more or loses less in the course of continuous work than does the relatively incompetent person. So far as the results of this experiment go, greater achievement per hour means less, and much less, fatigue per hour. This is shown, in the cases of the seven individuals who worked for approximately seven hours in the work-period, by the facts of Table 4. These seven cases show an inverse correlation

TABLE 4.  
THE RELATION BETWEEN ABILITY IN A FUNCTION AND  
FATIGUE IN IT.

Individual.	Corrected time for third four examples of work-period.	Corrected time for first eight examples after long rest.	Degree of fatigue; from column 5 of Table 3.
12	1611	1092	183
9	1980	1059	168
1	1715	898	145
11	850	618	155
8	540	495	128
2	637	275	136
10	625	256	136

between initial achievement and fatigue of about one-half and between achievement at the beginning of the test after rest and fatigue of about three-fourths. The relation in the case of the other subjects is not safely measurable. I estimate it to be inverse, but not so much inverse as in the seven commensurate cases; and in general I estimate the relation between achievement and fatigue per unit of time in this function as  $-.5 \pm .2$ .

#### THE COURSE OF FATIGUE.

In this experiment the decrease in efficiency due to fatigue is, during the work-period, itself counterbalanced by the increase due to practice. This is abundantly shown in Tables 1 and 5. In a majority of the subjects the work at the end of the fourth and seventh hour was better than at the end of the first half-hour or hour, and much better than at the very beginning. To measure the course of fatigue conveniently one needs experiments with a function already at its limit of efficiency. We can, however, from our data as they stand, get evidence as to whether the fatigue effect comes suddenly or gradually by observing the actual course of efficiency and allowing for the effect of practice. Table 5 shows no noticeable uniform sudden decreases in efficiency. The most rational interpretation of the records is that they are practice records, with the practice effect increasingly reduced with time by a steadily increasing fatigue. The few sudden decreases in efficiency that appear are best interpreted as the result of individual disturbing factors, for these fluctuations are often followed by equally sharp increases in efficiency, and show no uniformity in their time of appearance.

To systematize the inspection of these records, they may be presented as curves scaled so that the same distance along the abscissa represents the same time in each case, and so that the height of each ordinate represents the approximate efficiency of the function at each quarter or half-hour. Since the work was necessarily scored in units of time for a given number of examples, not in units of amount for a given time, the plotting of such curves can be done precisely only with an amount of labor very disproportionate to the value of the information

gained. I have approximated such plottings by observing the time and errors for doing the 2, 3, 4, 8 or 12 examples (choosing in accordance with the individual's speed) nearest each half-hour point over the five hours for each individual working five hours. The results show the onset of fatigue to be gradual.

That there is no uniform sudden rise of fatigue is in fact sufficiently shown by the fact that the greatest excess of fatigue over practice-effect (or the least excess of practice over fatigue-effect), in the case of any one approximate half-hour's work and that of the approximate half-hour following it, *comes at no uniform time*. Such a maximal apparent fatigue-effect comes after 0 minutes in one subject's record, after 103 in another's, after 115 in another's, after 128 in another's, after 143 in another's, after 156 in another's, after 195 in another's, after 364 in another's, after 256 plus 38 (with intervening lunch period) in another's, after 140 plus 324 (with intervening lunch period) in another's. This means, of course, that any sudden rise of fatigue is so slight, or so variable, or so slight and variable, that it does not outweigh the chance variations in efficiency.

#### THE RELATIONS OF THE FACT OF FATIGUE TO THE FEELING OF FATIGUE.

There are two relations of importance. One may ask, "What does (a) an individual's difference *from the average man* in actual diminution in efficiency per unit of work imply about (b) his difference from the average man in the intensity or duration of feelings of fatigue?" Or one may ask, "What does (a) an individual's difference at any one period during a long work-period, *from his own average for the whole period*, in respect to actual diminution in efficiency, imply about (b) his feelings of fatigue at that one period?" The questions may, of course, be put conversely. No exact measurement of either of these relations can be made from the data at my disposal. But a comparison of the reports by the subjects of the experiment of their feelings of fatigue, so-called, with the facts of Tables 1, 2 and 5, show that neither relation is at all close (probably not over .5 and possibly not over 0.)

Individuals 3, 12, 13 and 14, who showed the greatest effect of fatigue as a fact, do not report more intense feelings of fatigue than are reported by individuals 5, 6, 15 and 16, who showed the least effect of fatigue as a fact. Similarly the changes in intensity of felt fatigue during the experiment reported by individuals 1, 2, 5, 8, 14 and 16 do not at all closely parallel their changes in actual efficiency.

The reports were as follows:

- No. 1. "Fatigue came suddenly to disappear again and recur suddenly. It came sometimes when the work was bad or went slowly; at other times poor work would occur and no corresponding fatigue would be felt."
- No. 2. "A strange feature entered in a few places. My mind seemed not able to grasp the figures, and the more I worked, the more confused I became."  
Very tired last hour. Eyes were strained.
- No. 3. "The principal fatigue which I felt was physical; resulting from sitting so long in one position and the eye-strain."
- No. 4. "I think my mind was clearer at the close than at the beginning in both (series of tests.)"
- No. 5. "At first I could remember only two figures with any certainty. About the middle of the test remembered the six. Gradually lost this ability and the mind finally refused to remember any. Fatigue was gradual until about the last hour; then I completely gave out. Feeling of heat in the back of the head, pain in the temples, exhaustion in the muscles, especially in the arms and fingers. The second day began the work with more confidence, but fatigued more quickly. After working about 15 problems the brain refused to get results until within a few of the end, when it 'sprinted' and remembered five or six of the numbers, then relapsed, leaving pain in back of neck and twitching muscles."
- No. 6. "Work began at 1.25 P. M. I could not work steadily, as mental fatigue brought on severe headaches.

Second attempt made 9.05 A. M. Fatigue came gradually. Being exceedingly dizzy and having headaches at the end of two hours I thought it best to discontinue."

Third attempt at 6.30 P. M. Dizziness and headache after a brief hour.

- No. 7. No report on feelings.
- No. 8. "After the first half-hour I found that it gradually became harder to concentrate my thoughts. After dinner I had great difficulty in forcing myself to go back to the task."
- No. 9. "I did not suffer any great strain in this test, though it was exceedingly tedious."
- No. 10. "I felt alternately tired and rested as I worked; sometimes my head ached. At the end of each period I did not feel specially tired. I had, however, a giddy feeling most of the time, and seemed to have to work faster than I wished."
- No. 11. "I commenced to work willingly enough, but at the end of the first hour I wanted to stop badly. My mind would seem to 'slip a cog.' I was too tired for expression during the seventh hour."
- No. 12. "Work difficult. Not hard to concentrate at first. Near end of third hour mind began to wander. Almost unconsciously grasped at distractions; listened for telephone bell; wished to be interrupted. At end of fifth hour almost exhausted. Brought out all will power possessed; did better for a short time; 6 hrs. 32 mins. became utterly exhausted; could not hold numbers at all. Mind a blank. Exhaustion came gradually.  
"Next morning could get results much more quickly at first; mind seemed to tire more quickly."
- No. 13. No report concerning feelings.
- No. 14. "I worked from 9.35 A. M. to 1.20 P. M. I was interested in the effect of the experiment and was quite willing to continue for some time— not noticing

how tired I had become by 1.20. After I had stopped for lunch I realized that my eyes were very tired. I began again at 2.58 P. M. and had worked only seven minutes, when I felt as if I could not continue. From 3.05 to 4.27 I worked with the greatest effort. At that time I was more exhausted than I ever have been before. \* \* \* Fearing that further application might be too much of an eye-strain, I stopped work at 4.27."

- No. 15. "After an hour my eyes felt as burning coals of fire, my hands trembled, the back of my head had a 'drawing' feeling and felt uncomfortably warm. \* \* \* When at 8 P. M. I stopped the 'feelings' didn't stop. My head continued its 'large as a barrel' feeling, and in my head and down my spine little hammers kept up a lively tune. Only after a long time did sleep come.

"Great 'fatigue' was felt the next morning as well. The second test was delayed till late the next day."

- No. 16. "At end of third hour nervousness began; at end of fourth, intense hatred of work. Toward the end of the fifth hour fatigue diminishes because of consciousness that task is nearly completed. Fatigue came more or less rapidly toward the fourth hour, but before that there seemed to be a gradual tiring out."

TABLE 5.

TIMES AND ERRORS FOR EACH SUCCESSIVE FOUR EXAMPLES FOR EACH SUBJECT.

Time : minutes and seconds.	Digits wrong.	Examples wrong.	Time : minutes and seconds.	Digits wrong.	Examples wrong.	Time : minutes and seconds.	Digits wrong.	Examples wrong.	Time : minutes and seconds.	Digits wrong.	Examples wrong.
No. 1. M.			8.15	2	2	5.05	2	2	12.00	0	0
Monday.			8.30	0	0	10.40	1	1	14.00	2	1
1.51 P. M.			7.45	2	1	5.35	1	1	10.30	1	1
			6.45	2	1	6.15	0	0	7.30	1	1
37.00	5	2	8.30	2	2	6.55	1	1	Interrupted.		
?			12.10	3	2				10.30	1	1
22.30	5	4	5.00	2	1				8.30	1	1
22.50	5	2	5.40	2	2	Tuesday.			9.30	2	1
18.00	3	3	5.40	3	2	5.23 A. M.			6	0	0
20.15	5	2	9.40	2	1				6.30	0	0
25.30	1	0	6.45	2	1	4.00	2	1	9	2	1
20.40	6	4	5.15	2	1	4.35	1	1	7.30	2	1
18.05	4	2	6.10	2	2	4.40	3	2	11	0	0
22.15	1	1	7.25	1	1	3.50	3	2	13	}	
22.15	5	3	4.30	0	0	4.05	1	1	13		
20.30	1	1	5.15	0	0	4.20	1	1	7		
26.35	6	1	6.40	2	1	4.35	1	1	12		
			8.40	0	0	3.55	0	0	11		
			5.45	0	0	4.25	2	2	10	}	*
Tuesday.			4.35	1	1	4.50	1	1	11		
1.25 P. M.			9.10	2	1	3.45	3	1	10		
			Interrupted.			3.55	2	1	14		
14.10	1	1	6.00	1	1	3.15	2	1	11.30	2	2
13.10	2	2	6.50	4	2	4.10	3	2			
23.50	12	3	4.35	3	2	3.20	0	0	Interrupted.		
			5.45	0	0	4.15	0	0	10.30	1	1
			5.10	2	2	6.10	2	2	8.30	1	1
No. 2. F.			5.50	4	2	3.55	1	1	8	2	1
Monday.			5.20	3	2	3.25	0	0	9.30	0	0
5.50 A. M.			6.40	7	1	4.30	0	0			
			5.00	1	1						
12.30	4	2	5.30	2	1				*Records of errors lost. The work was substantially errorless.		
6.40	4	2	5.25	0	0						
9.00	4	2	6.25	3	1						
9.30	0	0	10.40	1	1						
9.40	1	1	7.05	3	3						
11.20	2	2	5.45	1	1						
8.30	3	2	5.55	3	2	18.00	0	0			
9.05	2	2	6.10	2	2	10.00	0	0			

TABLE 5 (continued).

TIMES AND ERRORS FOR EACH SUCCESSIVE FOUR EXAMPLES FOR EACH SUBJECT.

Time ; minutes and seconds.			Digits wrong.			Examples wrong.			Time ; minutes and seconds.			Digits wrong.			Examples wrong.		
No. 1.	M.		7	0	0	17.40	1	1	11.40	9	4						
			7	1	1	25.40	5	3	10.50	9	4						
(Continued.)			9	1	1	20.40	4	3	10	10	4						
			7	0	0				12	10	4						
6	0	0	7	0	0	Monday.											
6.30	2	1	7	0	0	10.50 P. M.			Saturday.								
9	2	1	4	0	0				12.15 P. M.								
7.30	0	0	5	0	0	15.10	2	2									
11	2	1	6	0	0	15.15	5	2	11	12	4						
13	1	1	10	0	0	19.25	5	3	10.30	11	4						
13	0	0	5	0	0	16.35	1	1	11.30	12	4						
7	0	0				15.45	7	2	10	12	4						
12	0	0	Monday.			18	6	2	11	11	4						
11	1	1	1 P. M.			18	0	0	11.30	12	4						
10	0	0				13.15	1	1	10	9	4						
11	0	0		0	0	19.30	2	1	10	9	4						
10	0	0		0	0	15.30	3	1	10	11	4						
14	1	1		0	0												
11.30	2	2		2	1												
				0	0												
Monday.				0	0	No. 5. F.			No. 6. F.								
8.17 A. M.			These 24 at an average rate of 2.48 for four examples.			Friday.			Saturday.								
						10.30 A. M.			1.25 P. M.								
6	0	0				13.10	12	4	14 examples in								
4	0	0				9.30	9	4	65 min.								
6.30	0	0				11.40	12	4	Errors 39	14							
10.30	0	0				8.30	16	4									
8	0	0	No. 4. F.			10.20	14	4	Monday.								
9	0	0	7.39 P. M. Sat.			8.30	16	4	9.05 A. M.								
7	0	0				14.30	8	4									
13	1	1	20.40	8	3	10.40	8	4	17	13	4						
6	0	0	36.20	3	2	11.30	14	4	14	18	4						
9	1	1	31.30	2	2	13.30	11	4	17	15	4						
7	0	0	30.40	0	0	11	12	4	15	16	4						
7	0	0	28.00	0	0	11	12	4	12.40	13	4						
13	0	0	17.50	1	1	11.30	11	4	16.45	11	4						
9	1	1	22.00	4	3												
5	0	0	18.10	0	0	10	16	4									



TABLE 5 (continued).

TIMES AND ERRORS FOR EACH SUCCESSIVE FOUR EXAMPLES FOR EACH SUBJECT.

Time: minutes and seconds.	Digits wrong.	Examples wrong.	Time: minutes and seconds.	Digits wrong.	Examples wrong.	Time: minutes and seconds.	Digits wrong.	Examples wrong.	Time: minutes and seconds.	Digits wrong.	Examples wrong.
No. 6 (cont.). Monday. 6.30 P. M.			No. 8. M. Saturday. 8 A. M.			10.05 0 0 10.50 0 0 10.55 1 1 10.25 1 1 11 3 2 11.20 1 1 9.45 5 3 12.10 1 1 10.15 0 0 12.05 2 2 10 1 1 11.55 3 3 8.25 6 3 10.40 3 2			20.25 3 3 31.25 6 4 22.35 8 3 21.10 1 1 25.30 10 4 Lunch, 60 min. 22.45 6 3 27.05 1 1 25.10 1 1 22.45 9 4 20.20 5 2 27.25 5 3 20.35 11 4 23 6 4		
13 13 4			15.30 1 1			11 3 2			25.30 10 4		
17.30 11 4			14.10 4 3			11.20 1 1			Lunch, 60 min.		
11 14 4			10.40 0 0			9.45 5 3			22.45 6 3		
			Sunday. 9.15 A. M.			12.10 1 1			27.05 1 1		
No. 7. M. Saturday. 6.45 A. M.			10.35 5 4 10.35 1 1 9.00 0 0 12 3 2 9.20 4 2 13 4 3 7.50 0 0 12.10 1 1 11.50 1 1 9.40 3 2 9.40 4 4 10.30 1 1 9.50 3 1 10.50 3 2 12.35 3 2 10.25 3 2 10.55 4 2 11.35 1 1 12.30 2 1 11.45 4 3 8.20 3 2 12.45 1 1 12.50 2 1 9 2 2 11.45 2 1 Lunch, 27 min. 10.15 1 1			Monday. 5 A. M. 7.40 2 2 7.05 2 2 8.10 0 0 7.40 0 0 7.20 0 0 8.10 4 2 8.00 3 2 8.50 1 1			Monday. 10.30 A. M. 13 7 4 16 2 2 13.30 2 2 19.05 6 4 21.50 3 2 17.10 2 1 20.35 1 1 18.05 5 4		
39 7 4			12 3 2								
47 8 4			9.20 4 2								
57 8 4			13 4 3								
40 9 4			7.50 0 0								
60 7 4			12.10 1 1								
51 6 4			11.50 1 1								
49 7 4			9.40 3 2								
51 6 3*			9.40 4 4								
50 9 4			10.30 1 1								
49 7 3			9.50 3 1								
48 6 4			10.50 3 2								
43 10 4			12.35 3 2								
39 10 4			10.25 3 2								
? 8 4			10.55 4 2								
42 8 3			11.35 1 1								
40 9 4			12.30 2 1								
Sunday. 6 A. M.			11.45 4 3 8.20 3 2 12.45 1 1 12.50 2 1 9 2 2 11.45 2 1 Lunch, 27 min. 10.15 1 1			No. 9. F. Sunday. 2.10 P. M. 41.05 8 4 35.05 6 3 25.25 5 2 33.45 5 3 21 5 3			No. 10. F. ? 12.20 P. M. 18.20 7 3 9 4 3 9.30 2 2		
35 8 3			12.45 1 1								
41 3 3			12.50 2 1								
*Lunch, 29 min.			9 2 2								
			11.45 2 1								
			Lunch, 27 min.								
			10.15 1 1								



TABLE 5 (continued).

TIMES AND ERRORS FOR EACH SUCCESSIVE FOUR EXAMPLES FOR EACH SUBJECT.

Time; minutes and seconds.	Digits wrong.	Examples wrong.	Time; minutes and seconds.	Digits wrong.	Examples wrong.	Time; minutes and seconds.	Digits wrong.	Examples wrong.	Time; minutes and seconds.	Digits wrong.	Examples wrong.
No. 11 (cont.).			No. 12 (cont.).			8.30	1	1	8.30	1	1
8.05	4	3	Next day.			9.10	1	1	9	5	3
11.05	8	4	10.20 A. M.			10.20	1	1	11	5	3
10	4	2				12.40	5	2	Lunch, 58 min.		
11.30	11	4	16.50	1	1	12.40	3	2	15	3	2
11.35	9	4	18.35	0	0				17	1	1
10.55	4	2	20.15	5	4	Wednesday.			15	3	2
14.50	6	4	21.25	6	4	11 A. M.			15	3	2
12	1	1							13	7	3
7.20	3	2				5.30	4	2	11	2	1
10.20	1	1	No. 13. M.			5.20	1	1			
12.30	6	2	Saturday.			4.25	2	2	Tuesday.		
12.30	1	1	10 A. M.			4.15	4	3	6.45 A. M.		
						5.30	3	2			
						4.50	6	2			
No. 12. F.			77.40	4	3				8	1	1
?			36.50	2	2				7	0	0
10.20 A. M.			29	1	1				7.30	4	2
			Lunch, 52 min.			No. 14. F.			5.30	5	3
20.18	3	3	14.50	5	2	Monday.			7	4	3
22.07	9	3	10.10	2	1	9.35 A. M.			6	2	2
22.45	3	3	11.30	1	1						
22	6	3	11.10	4	2	15	0	0			
21.23	3	3	11.10	0	0	14	0	0	No. 15. F.		
22.50	4	3	11.55	0	0	13	8	3	Wednesday.		
Lunch, 50 min.			9.05	0	0	13	2	2	3.30 P. M.		
22.15	2	2	11.10	2	2	12	2	1			
24.15	5	4	10.50	2	1	11	3	2	34	2	2
24.14	5	3	10.10	2	1	14	3	2	34	9	3
24.50	3	2	11.40	3	3	9	5	3	27.30	4	3
25.45	3	2	9.10	3	2	13	6	3	18.45	4	2
26.20	5	2	10.10	3	1	12	1	1	15.45	4	3
26.15	6	3	9.40	0	0	13	3	2	18	2	2
26.50	5	3	8.23	0	0	14	3	2	Lunch, 24 min.		
27.25	4	3	9.35	2	1	12.30	4	3	13.35	2	2
28.53	12	4	7.40	5	3	12.30	2	2	11.10	3	2
			11.10	3	2	11.30	3	2	12.45	0	0



# AN INVESTIGATION ON THE VALUE OF DRILL WORK IN THE FUNDAMENTAL OPERATIONS OF ARITHMETIC.

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## SUMMARY.

Five-minute drill-periods upon the fundamental number-facts, preceding the daily lesson in arithmetic, were found to be beneficial in the sixth, seventh and eighth grades. The benefit derived was proved by a comparison of sections subjected to the drill with sections of equal size and approximately equal ability not subjected to the drill, but otherwise undergoing the same arithmetical instruction. The benefit was not limited to improved mastery of the number-habits, but included increased efficiency in arithmetical reasoning. The improvement was still in evidence after the lapse of the twelve weeks' summer vacation. The benefit was most marked in the sixth grade, and least marked in the eighth grade, although it was significant in all three grades.

The purpose of the experiment reported here was to secure information concerning the value of short drill exercises in the fundamental operations of arithmetic.

In April of the present year the writer gave the tests in fundamentals and reasoning used by Stone and described on pages 10-12 of his book, "Arithmetical Abilities: Some Factors Determining Them." The tests were given to all of the pupils of the sixth, seventh and eighth grades of the practice school of the Eastern Illinois State Normal School at Charleston, Illinois.

The tests were given under the same conditions as the Stone tests (see pp. 13-15 of above reference), and the method of grading the papers was the same as that used by Stone (p. 17.)

The total number of pupils examined was fifty-one--eighteen boys and thirty-three girls. The average age of all the pupils

examined was thirteen and one-half years and all came from average American homes. All of the tests were given at 9.30 A. M., and the limit of twelve minutes for fundamentals and fifteen minutes for reasoning was strictly observed. The tests were personally conducted by the writer.

After the papers of the first test had been graded the pupils of each of the grades examined were divided into two sections as nearly equal in number as possible. In each grade the division into sections was upon the basis of ability in fundamentals as indicated by the individual scores made in the first test. The pupil who made the highest score in the first test was put into section one; the pupil who made the next highest score was put into section two; the one making the next highest was put into section one; the one making the next highest into section two, etc. The total number of pupils in the combined drill sections was twenty-five and in the non-drill sections was twenty-six.

After each grade had been thus divided, pupil teachers of as nearly equal teaching ability as were available were placed in charge of the sections. The two sections of a given grade recited at the same time each day and the recitation periods were of the same length, twenty-five minutes. Each section of a given grade covered the same amount of subject-matter in the text-book, but in one section of each grade the first five minutes of each recitation period was devoted to drill work in addition, subtraction, multiplication and division. About one-half of this drill work was written and the other half oral. The other section of each grade was given no special drill work. The pupils in the drill section were not told the object of the drill work.

This practice was continued for thirty recitation periods, when a second series of tests was given by the writer. The object of this second series was to determine the effect of the five-minute drill in fundamentals. Exactly the same conditions were observed in conducting the second test as in the first, and the problems were similar to those of the first test.

In order to determine whether the superiority secured by the five-minute drill exercises was transient or not on the first day of the fall term, the writer gave a third series of tests

similar in all respects to the first and second. Between the second and third tests a summer vacation of twelve weeks intervened, and during this period none of the pupils examined did any school work.

The following is a reproduction of the first test in fundamentals. The other two were very similar. The tests were printed separately and each pupil was provided with a copy:

$$\begin{array}{r} 1. \text{ Add } 2375 \\ 4052 \\ 6354 \\ 200 \\ 5041 \\ 1543 \\ \hline \end{array}$$

$$2. \text{ Multiply } 3265 \text{ by } 20.$$

$$3. \text{ Divide } 3328 \text{ by } 64.$$

$$\begin{array}{r} 4. \text{ Add } 596 \\ 428 \\ 94 \\ 75 \\ 302 \\ 645 \\ 984 \\ 897 \\ \hline \end{array}$$

$$5. \text{ Multiply } 768 \text{ by } 604.$$

$$6. \text{ Divide } 1918962 \text{ by } 543.$$

$$\begin{array}{r} 7. \text{ Add } 4695 \\ 872 \\ 7948 \\ 6786 \\ 567 \\ 858 \\ 9447 \\ 7499 \\ \hline \end{array}$$

$$8. \text{ Multiply } 976 \text{ by } 87.$$

$$9. \text{ Divide } 2782542 \text{ by } 679.$$

$$10. \text{ Multiply } 5489 \text{ by } 9876.$$

$$11. \text{ Divide } 5099941 \text{ by } 749.$$

$$12. \text{ Multiply } 876 \text{ by } 79.$$

$$13. \text{ Divide } 62693256 \text{ by } 859.$$

$$14. \text{ Multiply } 96879 \text{ by } 896.$$

A comparison of the results of the three tests will first be expressed in per cents and then stated in terms of other measures. In all of the summaries that follow, "I" indicates the combined drill sections and "II" the combined non drill sections. The first test refers to the Stone test; the second to the one immediately following the period of drill, and the third to the test given on the first day of the fall term of school.

## A COMPARISON OF THE RESULTS OF THE FIRST AND SECOND TESTS.

I	did	21.2%	better	on	2d	test	than	on	1st	in	number	of	problems	worked.
II	"	9.8%	"	"	"	"	"	"	"	"	"	"	"	"
I	"	33.4%	"	"	"	"	"	"	"	"	"	"	addition.	"
II	"	11.8%	"	"	"	"	"	"	"	"	"	"	"	"
I	"	36.9%	"	"	"	"	"	"	"	"	"	"	subtraction.	"
II	"	13.1%	"	"	"	"	"	"	"	"	"	"	"	"
I	"	30. %	"	"	"	"	"	"	"	"	"	"	multiplication.	"
II	"	13.7%	"	"	"	"	"	"	"	"	"	"	"	"
I	"	28. %	"	"	"	"	"	"	"	"	"	"	division.	"
II	"	19.3%	"	"	"	"	"	"	"	"	"	"	"	"
I	"	32. %	"	"	"	"	"	"	"	"	"	"	total number points made.	"
II	"	14.7%	"	"	"	"	"	"	"	"	"	"	"	"
I	"	5.8%	"	"	"	"	"	"	"	"	"	"	on first six problems.	"
II	"	2.4%	poorer	"	"	"	"	"	"	"	"	"	"	"

The number of problems worked in each test may be taken as a measure of the speed of the pupils. It is seen that the drill section increased its speed by a much larger per cent. than the non-drill section.

The drill section of the sixth grade made the greatest increase in speed, 35 per cent. The seventh grade drill section made a gain of 20 per cent. and the eighth grade of 13.8 per cent. in speed.

Since all of the pupils of all of the sections worked at least the first six problems, a comparison of the number of points scored on these problems affords a fair measure of the effect of the drill upon accuracy in the fundamental operations. The accuracy of the drill class, measured in this way, increased 5.8 per cent., while that of the non-drill class decreased 2.4 per cent.

The greatest improvement in accuracy was made by the sixth grade drill sections. The next greatest by that of the seventh and the least by the eighth grade.

The drill section of the sixth grade also made the greatest improvement upon its own record on the total number of points scored, a gain of 52.3 per cent. The seventh grade drill section made a gain of 33.5 per cent. and the eighth a gain of 19.5 per cent. The greatest individual improvement of the sixth grade was 105.7 per cent. and the least was 10.9 per cent. The greatest individual improvement in the seventh grade was 126 per cent. and in the eighth 61.3 per cent. The drill exercise proved about equally valuable to both boys and girls.



The coefficient of variability at the close of the second test was somewhat lower for boys than for girls.

Judged by the results of the experiment, the pupils of the sixth grade are the most benefited by a short drill in fundamentals.

In order to determine whether the gain in fundamentals, due to the drill work, was equaled or offset by a loss in reasoning ability, a test in reasoning was given. The drill section did 6.3 per cent. better than its own previous record in reasoning and the non-drill section made an improvement of but 3 per cent. on its own record.

A COMPARISON OF THE RESULTS OF THE THIRD TEST WITH THE FIRST AND SECOND.

*"I" indicates combined drill sections; "II" the non-drill sections.*

- I did 26.4% better than on 1st test and 4.1% better than on 2d test in number of problems worked.
- II did 9.8% better than on 1st test and same as on 2d test in number of problems worked.
- I did 25.4% better than on 1st test and 6% poorer than on 2d test in addition.
- II did 7.7% better than on 1st test and 3.7% poorer than on 2d test in addition.
- I did 46.2% better than on 1st test and 6.7% better than on 2d test in subtraction.
- II did 20.4% better than on 1st test and 6.4% better than on 2d test in subtraction.
- I did 31.3% better than on 1st test and 1.5% better than on 2d test in multiplication.
- II did 11.1% better than on 1st test and 2.2% poorer than on 2d test in multiplication.
- I did 36.7% better than on 1st test and 7.3% better than on 2d test in division.
- II did 11.1% better than on 1st test and 2.8% poorer than on 2d test in division.
- I did 31.7% better than on 1st test and 0.2% poorer than on 2d test in total points.
- II did 12.16% better than on 1st test and 2.29% poorer than on 2d test in total points.
- I did 5.2% better than on 1st test and .6% poorer than on 2d test in first six problems.
- II did 3.7% poorer than on 1st test and 1.3% poorer than on 2d test in first six problems.

The result of the third test indicated that the superiority of the drill class was maintained over the vacation period. The "period of hibernation" served to increase the speed, while those who had not had the advantage of the drill worked no faster than on the second test. The drill section did better on the third test than on the second in everything except addition and accuracy, and in these the records made were much

better than on the first test. The non-drill section either made no improvement or did worse than on the second test in everything except subtraction.

In order to afford a form more available for comparison, the following measures were computed. The average deviation was determined by using the median. The coefficient of variability was determined by dividing the standard deviation by the median. Treating the data in this way should reveal whether the improvement or deterioration is general with the entire group, or is confined to a relatively few individuals. By comparing the medians and deviations of the various groups (the median in each group being the score of the mid-most individual when all are ranked in order of achievement) the influence of the drill upon the group as a whole can be determined. If, as compared with the non-drill group, the drill section shows a decrease in the variation of individual achievement (the amount of individual variation being indicated by the average and standard deviation, and by the coefficient of variability), it may be inferred that the drill work has been of general benefit, and not merely of very great benefit to a very few individuals. An inspection of the following tables will show that the median score increased under the influence of drill and that the variability decreased; while for the non-drill sections the median score was increased on the second test, but in a smaller degree; the loss after twelve weeks was much greater, and the variability was significantly increased after twelve weeks. It is, therefore, possible that the provision for drill work operated to equalize the advantages which the arithmetic lessons afforded to pupils of varying abilities:

Drill sections.	1st test.	2d test.	3d test.	Non-drill sections.	1st test.	2d test.	3d test.
Median.....	41	53	52	....	41.5	49.5	46
Average Deviation.....	12.60	12.60	10.64	....	9.61	9.61	11.53
Standard ".....	16.124	15.14	15.40	....	13.79	14.67	16.91
Coefficient of Variability	.393	.280	.296	....	.331	.296	.377

Some of the data in the above tables will now be compared in terms of per cents. "I" indicates combined drill sections and "II" non-drill sections.

I	The median on 2d test was 20.2% higher than on the 1st.
II	" " " " " " 19.4% " " " " "
I	" " " " 3d " " 26.8% " " " " "
II	" " " " " " 10.8% " " " " "
I	" " " " " " 1.8% lower " " " 2d
II	" " " " " " 7% " " " " "

I and II, the average deviation, was not changed at close of second test.

I	Average deviation was 15.5% lower on 3d test than on 1st or 2d.
II	" " " " " " 16.7% higher " " " " "
I	Standard deviation on 2d test was 6.1% lower than on 1st.
II	" " " " " " 6.3% higher " " " "
I	" " " " 3d " " 4.4% lower " " " "
II	" " " " " " 22.6% higher " " " "
I	" " " " " " 1.6% higher " " 2d.
II	" " " " " " 15.2% higher " " " "
I	Coefficient of variability on 2d test was 28.7% lower than on 1st.
II	" " " " " " 10.5% " " " " "
I	" " " " " 3d " " 22.1% " " " " "
II	" " " " " " 13.9% higher " " " "
I	" " " " " " 5.7% " " " 2d.
II	" " " " " " 27.4% " " " " "

The following table gives the medians, average deviation, standard, deviation and coefficient of variable of the combined drill section in each of the four fundamental operations:

Addition.	1st test.			Subtraction.	1st test.		
	1st test.	2d test.	3d test.		1st test.	2d test.	3d test.
Median.....	19	19	19	....	4	7	7
Average Deviation....	3.36	5	3.52	....	1.88	1.60	1.68
Standard " .....	5.18	6.52	4.45	....	2.56	2.24	2.38
Coefficient of Variability	.27	.34	.23	....	.64	.32	.34

Multiplication.	1st test.			Division.	1st test.		
	1st test.	2d test.	3d test.		1st test.	2d test.	3d test.
Median.....	12	17	18	....	6	10	10
Average Deviation....	3.68	4.16	3.20	....	3.08	1.88	2.16
Standard " .....	5.099	4.899	3.920	....	4.33	2.68	3.24
Coefficient of Variability	.42	.28	.206	....	.72	.26	.32

Some of the data of the last two tables will now be expressed in terms of per cents.

*Addition:* The median was the same in all three tests.

The average deviation was 48.8 per cent. greater in the second test than in the first and was slightly greater in the third than in the first.

The coefficient of variability was 26.4 per cent. greater in the second test than in the first and slightly less in the third than in the first.

*Subtraction:* The median was the same in the second and third tests, and in each of these was 75 per cent. greater than in the first.

The coefficient of variability was 50 per cent. less in the second test than in the first and slightly more in the third test than in the second.

*Multiplication:* The median was 41.6 per cent. greater in the second than in the first test and  $66\frac{2}{3}$  per cent. greater in the third than in the first.

The coefficient of variability was  $33\frac{1}{3}$  per cent. less in the second than in the first and 57.1 per cent. less in the third than in the first.

*Division:* The median was  $66\frac{2}{3}$  per cent. greater in the second and third than in the first.

The coefficient of variability was 63.9 per cent. less in the second test than in the first and 55.5 per cent. less in the third than in the first.

The median was increased on the second test in all of the fundamental processes except addition, and the coefficient of variability was decreased in all except addition.<sup>1</sup>

The investigation just described proves nothing, but it indicates some probable tendencies. There has been no little dogmatizing upon the effect of short drills in arithmetic.

It is the hope of the writer that others may experiment along the lines just described, so that from a large number of scientifically conducted experiments reliable conclusions may eventually replace dogmatic statements.

All of the data from which the above summaries and conclusions were drawn are on file at the Eastern Illinois State Normal School and are accessible to any one interested in further details.

<sup>1</sup>Since computing the above data the writer has given similar series of tests in three of the city school systems of Illinois, and although the tabulation of the results is not yet completed, the results seem to corroborate the foregoing in all essential details.

# WHAT EDUCATORS THINK ABOUT THE NEED FOR EMPLOYING MEN TEACHERS IN OUR PUBLIC SCHOOLS.

LEONARD P. AYRES, PH. D.

*Russell Sage Foundation, New York City.*

One of the first acts of Mayor Gaynor's administration in New York City was the creation by the Board of Estimate and Apportionment of a commission to investigate and report on problems connected with the payment of teachers in the public schools. This commission, appointed in January, has been at work for the past nine months and submitted its final report in October.

According to the wording of the resolution creating the commission, the duties of that body were "to investigate the justice, economy and adequacy of the present and proposed schedules of salaries for the payment of teachers." One of the chief objects of the Board of Estimate in appointing the commission, and one of the principal problems that that body had to confront, involved the investigation of the vexed questions connected with the controversy vigorously waged for some years by the New York women teachers for "equal pay for equal work."

With the object of securing light on this matter, one of the first acts of the commission was to address letters to the leading American educators, requesting them to state their opinions with respect to the necessity for employing men teachers. They were requested to state:

1. Whether or not they believed that the public schools need men as teachers and principals.
2. Whether or not they need them as teachers to train them as principals.
3. In what grades and for children of what ages they need male teachers.

4. What, if anything, a man teacher contributes that is not equally contributed by a woman teacher.

5. If they believed women to be more efficient teachers than men, the grounds for that belief.

These letters were sent to the presidents of universities, principals of normal schools, heads of departments of education in universities, writers and lecturers on education, superintendents of city schools and school authorities in New York City. One hundred and five replies were received. Of these replies one hundred gave answers to all or some of the questions.

The first question, whether or not the public schools need men as teachers and principals, was answered in the affirmative in ninety-eight out of the hundred replies, and in the negative in one reply. It was unanswered in the remaining letter. The following are some typical answers to this question:

"For both boys and girls—but especially for boys—there is need in the grammar grades and in the high school of positive influences that are masculine in character, as well as of positive influences that are distinctly feminine."—*U. S. Commissioner of Education, Elmer E. Brown.*

"Boys from twelve to fifteen, and probably girls, ought to have the teaching of a man for at least part of the time."—*David Snedden, Commissioner of Education for Massachusetts.*

"I believe that the public schools need men as teachers and principals."—*Walter E. Ranger, Commissioner of Public Schools for Rhode Island.*

"I believe about the worst crying need of our schools is more male teachers in the upper grades."—*President G. Stanley Hall of Clark University.*

"I would say that the educational work in the schools of the country is now suffering from its desertion by men and its practical monopoly by women."—*President J. G. Shurman of Cornell University.*

"I am fully convinced that men teachers are indispensable in the high schools, and in the upper elementary grades are highly desirable."—*Hugo Münsterburg of Harvard University.*

"The public schools need men both as teachers and as principals, and the need for some men in every large school begins as early as twelve years of age for both boys and girls."—*Ex-President Charles W. Eliot of Harvard University.*

"It is my opinion that men are highly necessary as teachers and principals in the public schools."—*F. H. Beede, Superintendent of Schools, New Haven.*

"Undoubtedly it is desirable to have men teachers for boys above the age of thirteen or fourteen."—*Stratton D. Brooks, Superintendent of Schools, Boston.*

"It is most advisable to employ some men teachers in the upper elementary grades."—*J. M. Greenwood, Superintendent of Schools, Kansas City, Missouri.*

"The elementary schools, in my judgment, need men as well as women both as teachers and as principals."—*A. B. Poland, Superintendent of Schools, Newark.*

"If the child in the home needs the father as well as the mother for proper home-training, then it needs the man as well as the woman in school for its proper school-training."—*M. G. Brumbaugh, Superintendent of Schools, Philadelphia.*

The second question was whether or not the schools need men teachers in order to train them to be principals. Fifty-seven of the answers were affirmative and five negative. In thirty-eight cases the question was not answered.

The third question was in what grades the schools need men teachers and for children of what ages. Eighty-five replies were to the effect that men are needed for the upper elementary grades and the high school. Three persons answered that they are needed in all the grades, while one said that they are not needed at all. Eleven did not answer the question.

The fourth question was what, if anything, a man teacher contributed that is not equally contributed by a woman teacher. One answer was "Nothing desirable;" two others said that the man teacher contributes nothing at all that is not equally contributed by the woman teacher. Twenty-three did not answer the question. The other seventy-four answers not only stated positively that the man teacher does contribute something that is not equally contributed by the woman teacher, but attempted

to specify. The trend of the answers may be judged from the following words and phrases given in answer to the question:

"Positive influences distinctly masculine in character. Masculinity. Man's viewpoint of life. Power. Elements of strength, of deliberative judgment, of logical power, of executive force. Positive convictions, practical sense, breadth of vision and sound judgment. Manly influence. Man's point of view on questions of civics, ethics and conduct. Vigorous, aggressive and ambitious attitude toward life. Man's interest in mechanical contrivances, helping to develop the practical inventive faculty in boys. Man's interests in and understanding of the fundamental principles of government and man's duties as a citizen."

One of the most definite statements of the constructive sort was from the pen of the Superintendent of Schools of the city of Holyoke, Massachusetts, who wrote:

"A man teacher contributes a fairer and more just treatment of boys through man's better understanding of boy nature; an understanding based upon man's experience as a boy; an understanding which a woman can never have simply because she is a woman."

Another clear expression of a different point of view came from the Superintendent of Schools of Elizabeth, New Jersey, as follows:

"I am strongly of the opinion that the presence of women as teachers of boys in the upper grammar grades, and even in the first and second year of the high school, causes thousands of boys to become disgusted with and to leave the schools. Of my own knowledge many young men have been driven from school because of their intense dislike to being (using their own words) 'bossed by women.' \* \* \* Indeed, I am inclined to think that one reason for the evident contempt with which many business men look upon the public schools lies right here. Those men, many of them, were forced out of school because of their intense individualism, because they were strong, because they had reached an age where it was imperative that they be instructed, directed, controlled and led by one of their own sex, and by a man larger and broader, both physically and mentally, than each youth felt himself to be."



The final question of the five was in effect whether or not those answering believed women to be better teachers than men. This was answered by fifty-nine persons. Forty-one said that they believed that women were more efficient than men as teachers of the lower grades and three considered them more efficient in all grades. Eight said that they did not believe women to be more efficient teachers than men; and seven said that they were as efficient, but not more so. Forty-one did not answer the question.

The tabulation of the results of the inquiry shows that while many of the correspondents left one or more of the questions unanswered, there is great unanimity of opinion expressed where answers are made. The results show that in general these educators hold that:

1. The schools do need men as teachers and principals.
2. They need them as teachers to train them to be principals.
3. They need men teachers in the upper grades and in the high schools.
4. The qualities contributed by the man teacher that are not equally contributed by the woman teacher are distinctly masculine in character.
5. Women are superior to men as teachers of the lower grades.

The members of the Salary Commission were unanimously in accord with these opinions, holding that the best interests of our educational system demand that there shall be in the schools a sufficient number of men teachers so that every boy may come under the influence of a man instructor before completing his school course.

## COMMUNICATIONS AND DISCUSSIONS.

### INSPECTOR WINCH'S EXPERIMENTS ON TRANSFER.

"And have you further remarked, that those who have a natural talent for calculation are generally quick at every other kind of knowledge; and even the dull, if they have an arithmetical training, gain in quickness, if not in any other way."—*Republic*, Bk. VII.

Plato may imply only correlation in the first section, but certainly maintains transfer in the latter. Formal discipline has been invoked from Plato's time to the present as a defense of the courses in mathematics. Whether or not the "queen of the sciences" needs such a defense may be considered apart from the question of its validity. Inspector Winch's experiment in the December number of this Journal should be of considerable value in initiating further researches along the same line as a preliminary study to the more important one of the "transfer" of accuracy in reasoning from the arithmetical to other situations.

Several observations suggest themselves:

(a) It would seem that interest as well as association might partly account for the degree of correlation found to exist between accuracy in computation and reasoning.

(b) It is probably not unfair to assume that practice curves in both computation and reasoning would not differ materially from the learning curves of Bryan and Harter, Book et al. While these curves have a general similarity in form, physiological and other conditions (those of units, etc.) never yield a smooth curve. The extreme shortness of the time given to the experiment, together with the minor irregularities of the curve, would scarcely show any measurable increase in efficiency, particularly as it may be assumed that the children are very near to the saturation point where the plateau effect appears.

(c) The material of the experiments may be improved greatly, particularly the rule sums. The Curtis Tests, where the reasoning elements have been differentiated as completely as possible from

those purely mechanical, and the computation elements reduced to simplest form, would be admirable material for such an experiment.

(d) The weighting of steps in problem work seems somewhat unsatisfactory. The following suggestion is only tentative. Problems do not increase in difficulty directly as the number of steps increases. It might be assumed as a more probable hypothesis that the increase is directly as the square of the number of steps.

Inspector Winch's paper is most valuable to the teacher of arithmetic. The last paragraph cannot be too highly commended. No amount of theoretical dogmatizing adds to or detracts from the almost universal lay belief in transfer.

The work of Thorndike, Stone, Courtis, Winch and others is the most hopeful sign of the times in determining not only the value of the individual teacher's work, but the place of mathematics in the curriculum.

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Brooklyn, N. Y.

#### THE NEW YORK STATE TEACHERS' ASSOCIATION.

The thirty-fifth annual meeting of the New York State Teachers' Association was held in Rochester, December 27 to 30. The attendance was large, the interest keen, the papers of a high order, and the entertainment and courtesy extended by the Rochester teachers was most cordial and liberal. There were valuable papers and discussions in every section as well as excellent exhibits, but it will be possible to mention only some of the special features of the program.

The subject of music received considerable attention. The Regents' Committee held a meeting, and the music section in its sessions showed the backward condition of the subject and emphasized the fact that as a nation we do not know music and therefore do not enjoy it as we should. The place to remedy this is in the public schools, but it can only be done when teachers are capable of teaching this subject as skillfully as they do the other subjects of the course. It was maintained that music has for the child as high a value in a disciplinary way as any other subject, and its cultural value is superior.

The Normal and Training Schools section discussed the training

of teachers from various points of view, among which that of the superintendent was prominent. The drift of opinion seemed to be that teachers need more training or better training, and that their most evident defects are found in those subjects, as English and arithmetic, that were studied before entering the training school. That the students need review work in the subject matter, as well as in the methods of teaching elementary subjects, is clear, and Normal and Training Schools should see that they have it.

It was suggested that students after graduation be put on probation under some kind of supervision. There was some criticism to the effect that students from these schools soon lose their enthusiasm unless they get into a live school system under a live superintendent. The Normal and Training Schools can at best only give them their first enthusiasm, and later environment must keep it alive and growing.

The discussion of college recognition of normal school work showed no uniform practice among the colleges, but the general opinion seemed to be that the normal schools should receive full credit in all cultural courses, large credit in educational courses, but only small credit in scientific courses.

The section that considered the subnormal child was well favored by having Dr. H. H. Goddard and Dr. L. P. Ayers on their program. These men are so conversant with this problem that their conclusions come to us with great force. Dr. Goddard recalled the facts concerning the subnormal child, described the treatment pursued, and showed clearly and forcibly the necessity of segregation and of specially trained teachers. He pointed out the serious results which follow from the old method of permitting these 400,000 children to encumber and burden the work in the lower grades of our schools, and urged that in every school system children who are falling behind be graded by the Binet tests, and, if necessary, assigned to special classes.

Dr. Ayers showed how the educational machinery was clogged by the backward children. Only 58 per cent. of the children are carried through to graduation, less than half enter the high schools, and only one in six is graduated from the high school. This is a serious condition of affairs, not only to the individual who drops out since he does not have the knowledge necessary to make a good citizen, but also for the State. Much time and money has been expended to learn why children drop out of school. One cause is

that the law says a child shall attend school from his eighth to his fourteenth year—six years—while the courses are eight or more years long and adapted to the needs of the bright child. Irregular attendance is another cause, and in this parents are much to blame. A third cause is the physical condition of the children, for one-sixth of the children leave school because of ill-health. When we shall see that a child does not merely sit in our schools the required length of time, but that he is developing his powers, great or small, by that stay, then shall our schools be measuring up to the ideal of the real school.

The question of promotion in the elementary schools was made much of in the Elementary section, and the suggestions made, if they could be followed, would help to solve the problem of the backward child. Some of these suggestions were that the curriculum be differentiated for various children; that the school subjects be broken up so that a child could complete a smaller part of the subject; that the child have an individual program and be permitted to go ahead in such subjects as he is able to handle; and that individual and department teaching might help to solve the difficulty.

Thursday evening State Commissioner of Education, Andrew S. Draper, addressed the association on the subject, "The Education Which Concerns New York." Among other things, he said that the main educational concern of New York is that her people shall be trained in common honesty; where that is accomplished much of the other training takes care of itself; if it is not assured, the other training is of little avail. Education that has life and enters into life; education that makes a living and makes life worth living; education that can use English to express itself; education that does not assume that a doctor must be an educated man and that a mechanic or farmer cannot be; education that appeals to the masses; that makes better citizens and a greater State; education that supports the imperial position of the State and inspires education in all the States; that is the education that concerns New York.

William H. Maxwell, superintendent of the schools of Greater New York, spoke on the topic, "The Next Step Forward in Elementary Education." In school special habits must be formed in connection with the teaching of every subject in the curriculum. By carrying the special habits so formed into every phase of life the school may cultivate those general habits which lie at the foundation of happiness and success. As enumerated by Mr. Maxwell, those

habits are: The school virtues of order and obedience, the moral and intellectual habits of taking pains and concentrating the mind upon the work in hand, careful observation, logical memory, careful scrutiny of one's own work to eliminate errors and insure correctness, inquiry as to the how and why of every process we try to understand and perform, clear expression of the results of observations and reasoning. The next forward step in public education is, according to Mr. Maxwell, the making of a united effort in all schools by all teachers to develop in the rising generation the right moral and intellectual habits.

Dr. George P. Bristol of Cornell University was elected president of the association for the ensuing year, and it is probable that the next meeting will be held in the new Education Building at Albany.

C. B. ROBERTSON,

Superintendent of Training Schools, Cortland, N. Y.

## ABSTRACTS AND REVIEWS.

GUY MONTROSE WHIPPLE. *Manual of Mental and Physical Tests.*  
(Baltimore: Warwick & York, Inc., 1910. Pp. xix, 534. \$2.50.  
Postage 18 cents extra.)

The sub-title of this work states that it is "a book of directions compiled with special reference to the experimental study of school children in the laboratory or classroom." This purpose is conceived in a very broad way, however, so that in addition to directions, there are quite extended discussions of methods and results. The need of a volume of this character has long been acutely felt, and there can be no doubt of the warm welcome it will receive. Since it is essentially a pioneer in its own field, it will doubtless fail to satisfy certain needs, and supplementary manuals will follow. This stimulation of other workers will be among its most valuable consequences. As in so many other undertakings in life, the first step is the difficult thing.

Of the practical effectiveness of the book the reviewer is hesitant to speak in advance of actual experience, so often has he seen highly-lauded books fail in the test of real use. Certain of the requisites for success the book undoubtedly possesses. The directions are generally brief and clear, and the commentary which accompanies the instructions is lucid and well-polished. The text has a reasonable number of illustrations, and these contribute distinctly to its intelligibility. They smack rather strongly of advertisement for a certain firm of instrument makers, to whom the author acknowledges indebtedness for his original decision to attempt the work. This firm, as stated in the preface, will undertake to furnish the apparatus called for. The reviewer is not disposed to quibble over a point of etiquette—if indeed it exists in this case—but the purely scientific character of the book is not the gainer by the recurrent appearance of this commercial element in the cuts. In one case a card bearing the firm name is pinned up in view, quite separate from the apparatus itself.

In the selection of tests there must inevitably be much difference of opinion as to what may wisely be included. The reviewer has felt disposed to dissent from the author's decision in only a few instances, and then on grounds which are by no means convincing to an unbiased judge. But the relative value of the several tests varies widely and the author might perhaps have indicated more fully what are the obvious advantages and disadvantages attaching to those chosen, when measured by any of the common demands for such tests. The young teacher who may wish to make use of these materials will certainly be puzzled to secure a proper perspective.

The field covered by the tests includes on the physical side the ordinary anthropometric measurements of height, weight and skull dimensions; physical measurements of lung capacity, and muscular power and control. The strictly psychological tests concern sensory capacity, attention, description, association, memory, learning, suggestibility, imagination (?), and invention (?), intellectual equipment (?), and at the end are added the De Sanctis and Binet-Simon diagnostic tests.

It seems a trifle odd that a product of the Cornell laboratory should have no special tests on imagery analysis, especially one who has himself made interesting contributions to the subject. The reviewer finds no ready explanation for this omission, which from some points of view seems to him the most serious of which the text is guilty. Tests touching this matter are, to be sure, far from satisfactory in their present form, but in technical adequacy they are distinctly superior to a number included by the author and their general psychological interest and significance is quite superior to several he employs.

To be sure, there is one chapter devoted to tests on "imagination and invention," but on examination they prove to be tests whose dominantly objective character renders it possible to perform them without gaining any penetrating analysis of the imagery used. Of the "ink-blot test" the author makes the rather unguarded statement that: "The ink-blot test serves primarily as a test of visual imagery" (p. 435). Now, the test may be so conducted as to elicit a good deal of information about visual imagery, but in the form in which the author prescribes it, persons quite deficient in visual imagery may achieve considerable success. It certainly cannot be used as a test of visual imagery without employing many qualifying precautions.



The remaining tests of the section (*e. g.*, word building, completing mutilated sentences, etc.), whether considered as tests of imagination or of invention, have the general shortcoming that they over-emphasize verbal processes almost to the complete exclusion of other types of inventiveness.

The intellectual equipment tests (one on vocabulary and one on information) must either be understood very literally as serving to indicate the materials available in the mind, or else be supplemented with problem-solving tests of a more representative kind than those involved in the previous section on inventiveness. This is so obvious as to require no discussion. Intellectual equipment in any ordinary sense involves sagacity, quickness, fertility, quite as much as sheer information and vocabulary, which are the points tested in the procedure of the text.

In one direction only does the reviewer entertain misgivings as to the influence which the book will certainly exercise. In connection with the several tests the author has brought together in a most helpful way results gathered from the literature of the subject. These results are set down very succinctly and clearly, but with little effort to estimate their relative worth. Such an estimate is, of course, often very difficult to make and very delicate to formulate. Nevertheless, it fairly falls within the jurisdiction of the writer of a book like this to make such distinctions. The evil result of failing to make them arises from the fact that a surprisingly large number of persons is wont to take such citations uncritically as all possessing equal validity, which they rarely possess, and as all applying to exactly the same circumstances, which is rarely true. Of this the reviewer has recently had most impressive experience. Now, among Dr. Whipple's citations are a considerable number of researches of which the reviewer has had some intimate personal knowledge and their relative value as science varies in a very extreme degree, but the reader of this book would secure no indication of the fact. In this way much pseudo-scientific information, which at best may be true, is propagated as established fact on which conclusions and practices of serious importance are based.

All the points, however, upon which strictures might be passed are of minor consequence when compared with the high general level of scholarship and expository skill which the book reflects. Dr. Whipple has done an extremely valuable thing, and done it extremely

well. The publishers have supplied a clear, legible page, although typographical errors are rather numerous. Excellent indices render the materials of the book readily accessible.

University of Chicago.

JAMES ROWLAND ANGELL.

F. WATSON. *The Beginnings of the Teaching of Modern Subjects in England*. (London: Sir Isaac Pitman & Sons, Ltd., 1909. Pp. lvi, 553.)

This is a type of work that is sadly needed in the history of education—an intensive study of a single epoch. In the author's earlier work (*The English Grammar Schools to 1660*, Cambridge, 1908) there are abundant evidences of erudite and painstaking scholarship. These evidences are even more numerous in the present companion volume. The greatest value of the study of educational history lies, we believe, in the perspective that it gives the student with reference to present problems. A careful consideration of the difficulties that the modern languages, the sciences and mathematics had to overcome before their position in the educational curriculum could be assured should certainly give one not only an increased appreciation of the fundamental character of educational conservatism, but also a new access of courage and determination in advocating merited innovations. Like Professor Watson's earlier work, the present volume will be warmly welcomed by teachers of the history of education who desire a convenient summary of source-materials in this important field. Unfortunately, the author's style leaves much to be desired in the way of clearness and helpful organization of materials, but one will readily forgive this in light of the care with which the materials have been selected and the illuminating comments with which quotations from the sources have been annotated.

W. C. B.

A. C. PERRY, JR. *Problems of the Elementary School*. (New York: D. Appleton & Co., 1910. Pp. viii, 224. \$1.25.)

This book consists of two parts: (1) Problems in the organization of elementary schools, and (2) problems in method and management. As a principal of one of the large elementary schools of New York city, and as a man well trained in educational theory, Dr. Perry has a right to speak authoritatively upon these topics.

The first part of the book discusses (1) the organic structure of

the elementary school, (2) the curriculum, and (3) the fundamental problems of moral training. The American system of elementary and secondary education, forming, as it does, "an educational ladder, with one end in the gutter and the other end in the university," is, Dr. Perry believes, much less efficient in meeting the needs of the people than are differentiated schools of European countries. He proposes a modification of our present organization in the direction of the European plan, saving our democratic ideals by providing plentiful opportunities for transition between the schools for the masses and the schools for the classes. In other words, he would have several educational ladders, some leading directly to industrial life, others to that stage of liberal education that is represented by the high school, and others to professional life; but he would be careful to provide opportunities for transfer from one ladder to any other in case a pupil found that he had made the wrong start. The author's discussion is interesting, but one is tempted to question the possibility of preserving the ideal of equality of opportunity under such a system. Dr. Perry seems to have neglected one factor that does more, probably, to preserve democratic ideals than anything else in our educational system, namely, the association of children of all classes in the same school and in the same work. No doubt something is lost by this arrangement, but something of vital importance is surely gained—something that would be entirely lost if the masses and the classes were segregated in their early education. Nor is the difference between the American elementary school and the German *Volksschule* so broad as Dr. Perry would have us infer. So far as the *content* of its curriculum is concerned (with the modifications that are now being introduced), our elementary school is essentially a people's school, and whatever waste it involves will, in the near future, be borne, not by the 90 per cent. who never get any farther than the eighth grade, but by the 10 per cent. who go on. From the point of view of *preparation*, it is the latter class that would be benefited by segregation, not the former. And yet, as has been suggested, this benefit would be at the expense of the ideals of democracy, gained through the intimate association of children of all classes.

In connection with the curriculum, Dr. Perry makes some suggestions that merit careful consideration. Recognizing the importance of the fundamentals, he insists that drill and repetition are abso-

lutely essential to their mastery, and that drill and repetition are bound to be neglected in an overburdened curriculum. He recommends (1) cutting the requirements in the fundamental subjects to an irreducible minimum and then teaching these subjects thoroughly, and (2) eliminating all drill methods from the accessory subjects, and teaching them frankly "in the spirit of privilege, not as a duty or task."

The chapter on moral training is brief, but it contains much that is fundamental in this important task of the school—much, indeed, that educational theory has temporarily lost sight of. The author insists that "to make a task interesting through the petty devices of teaching method is to make it fruitless for will training." He does not, on the other hand, find effective moral training in drill tasks *per se*. "It is only when a pupil submits himself to unattractive drill through the operation of some ideal which he recognizes *for himself* that he is gaining in will power" (p. 70).

The second part of the book is the portion that will undoubtedly be found most helpful to the average teacher. It is made up largely of practical suggestions regarding the teaching of upper-grade English, history and arithmetic. A very valuable discussion of the uses to which the blackboard may be put, suggestions regarding the building up of a school museum and an excellent chapter on the care of adolescent girls conclude the volume.

W. C. B.

## NOTES AND NEWS.

The plan for the encouragement of investigations in experimental pedagogy, outlined in the January number of this JOURNAL, is meeting with the cordial support of psychologists and educators, and has called forth words of hearty approval from all parts of the country. Arrangements are being perfected for the preliminary surveys, which will set forth important problems in each school subject and will indicate the most advantageous methods of attacking them. We are convinced that these studies will be of great value to the progressive teacher, whether in the elementary or in the high school, and we are anxious to bring them to the notice of teachers who are not already readers of this JOURNAL. To do this we need your assistance. If you believe in the cause of the scientific study of education, if you desire to see that cause progress and become a dominating influence in the practice of the schools, will you not take the trouble to write out and send to the Managing Editor the names and addresses of fifteen or twenty of your acquaintances who might be interested in such experimental studies of teaching?

J. C. B.

The most important movement that we can foresee for psychology in the decade which we now enter is perhaps the coming of the consulting psychologist—an expert in psychology, who may be employed as adviser in matters pertaining to the ascertained facts of mental life with reference to their bearing upon a given practical situation, or may be employed to search for, or verify, such facts by special investigation. He will not be an administrative officer, not a practicing physician or teacher, not a “pure” scientist, not a reformer, not deprived of scientific freedom, but will choose some phase of applied psychology as his profession and pursue it intensively as a life work. For applied psychology cannot always live by the crumbs that fall from the professor’s table, nor can it get its full vitality from the non-psychological professions. It must be fostered by the specialist who devotes himself to it for its own sake. It must recognize itself, its own peculiar technique, its vastly varied fields and diversities, its

stupendous difficulties, its essential limitations, and withal, its promise and worth. The work of the consulting psychologist falls roughly within the four general fields—(1) mental pathology, (2) education, (3) the arts, crafts, professions and industries, and (4) eugenics.

C. E. S.

ROCHESTER ABOLISHES SCHOOL FRATERNITIES. We offer our congratulations to the school authorities of Rochester, N. Y., for their action in unanimously voting to abolish the five fraternities and five sororities in the high schools of that city on the ground that they "promote exclusive and undemocratic class conditions, fix premature and artificial social standards, detract seriously from the regular work of the school, stimulate extravagant habits and involve a burdensome expense." According to press reports, communications from parents in response to the inquiries of the board showed that 85 per cent. of the parents favored the prohibition of the societies. As to the attitude of the fraternity men, the same press reports are authority for the statement made by the "Secretary of the Grand Inter-Fraternity Council of the United States" that "arrangements would be made to continue the organization in some other form, despite the board's ruling."

The high-school secret society problem is by no means so simple or so easily solved as it appears on the surface. We hope in the near future to set forth the history and status of the movement and to discuss the psychological and scholastic issues involved. For the present we can only place upon record the action of the Rochester authorities, with the assurance that every such action makes easier the task of ridding the public schools of what is almost universally felt by schoolmen to have become an intolerable nuisance.

G. M. W.

All science involves the quantitative measurement of results. The introduction of scientific methods into the management of large industrial and manufacturing concerns has given rise to the efficiency engineer, whose function is to study carefully all the details of the business, to determine the most productive treatment of raw materials, to eliminate waste, to make the best use of by-products and to raise the efficiency of labor and power to the highest degree. It is interesting to note that with the advent of the scientific attitude in

education a similar trend may be observed in that field. In the January number of this JOURNAL Professor Strayer cogently set forth the desirability of measuring results in education. In a recent report to the faculty of the University of Chicago the committee on instruction recommends the appointment of an efficiency expert, "who shall be relieved from instructorial duties and given the task of investigating conditions and problems of undergraduate instruction." In other words, a highly-salaried specialist is to be employed, whose sole duty it shall be to study the raw materials that come to the university, the complex activities of the plant, and the character of the output, in order to increase the efficiency of the work done.

As this note is being written information reaches us that a small university of the Middle West contemplates the appointment of a professor of "Individual Attention," who shall be a specialist in heredity and the modification of hereditary traits by environment, in aptitudes and temperaments, in interests and capacities, who shall do no teaching, but who shall give occasional lectures to various classes in the institution, and who shall devote most of his time to making records of individual students, studying their ancestry, their home environment, their native tastes and capacities, their interests, desires and ambitions, in order that the university may be of the utmost possible service to them in their physical, mental and moral development.

Let it not be said that the advent of the efficiency expert means the commercializing and mechanizing of education. On the contrary, it makes for the realization of the highest ideals of individual development—a development which is seldom consciously striven for, and attained only by chance under the prevailing, haphazard mass regime. Particularly to city school systems is the idea of the educational efficiency expert to be commended.

J. C. B.

At the meeting of the American Psychological Association, in Minneapolis, there were three groups of papers which would interest the readers of this JOURNAL, namely, (1) on education, (2) on the use of psychological terms and (3) on the psychology of religion. There were five papers on the learning process: L. W. Cole, "Relation of Strength of Stimulus to Rate of Learning in the Chick"; John F. Shepard, "Some Results in Comparative Psychology"; Frank N. Freeman, "Experiments on the Perception of Number"; Edgar James Swift,

"The Genesis of Attention in the Educative Process," and Daniel Starch, "Periods of Work in Learning" and "Transference of Practice." Professor Seashore read a paper on "The Consulting Psychologist." Section L of the A. A. A. S. devoted one afternoon to the topic "Transference of Discipline," in which Dr. W. F. Dearborn and Prof. S. S. Colvin read papers, and a very lively discussion ensued. At another session of Section L the following papers were read on education: E. L. Thorndike, "The Causes of Elimination from High School"; C. H. Judd, "The Relations Between the High Schools and the Colleges"; Max Meyer, "Experience with the System of Grading in the University of Missouri"; F. E. Lurton, "A Study of Retardation in the Schools of Minnesota," and Irving King, "The Problem and Content of a Course in Social Education."

A joint session with the Western Philosophical Association was devoted to the topic, "Philosophical and Psychological Usages of the Terms Mind, Consciousness and Soul," in which papers were presented by Professors J. R. Angell, B. H. Bode, E. H. Lindley and G. A. Tawney, and a very profitable discussion followed. Closely connected with this discussion was a paper by Professor Thorndike on "The Study of Consciousness and the Study of Behavior."

Prof. Edwin D. Starbuck and Dr. Irving King presented papers on the question of the instinctive nature of religion, and on the same program Dr. Rowland Haynes presented a paper on "Case-taking in the Psychology of Moral and Religious Experiences," and Prof. Edward S. Ames on "The Genesis of the Group Spirit."

The presidential address, by Prof. Walter B. Pillsbury, was on "The Place of Movement in Consciousness," and the presidential address of Prof. E. B. McGilvary of the Western Philosophical Association was on "The 'Fringe' of William James' Psychology as the Basis of Logic."

A committee of the faculty of Oberlin College, which has been working for more than a year on "tests of college efficiency," has submitted its report to the president. The report deals with (1) the educative process in the college, including government, administration and instruction; (2) the quality of the output, involving a consideration of the scholastic efficiency of the graduates, their success in active life and their general intellectual efficiency, and (3) the cost of the college and its operation. It is to be hoped that in time



the report will be accessible to the public. Such investigations point the way toward the introduction of some experimental pedagogy in college teaching. One is curious to know what units of measure were adopted in estimating the relative importance of some of the quantities mentioned.

The Committee on Backward Children Investigation appointed by the Superintendent of Schools under the authority of the Board of Public Education of Philadelphia has been at work for a year making examinations of the individual children reported as institutional cases. In all, reports will be made upon about a thousand children of the special and disciplinary classes, and upon about two thousand children in the regular primary grades, first to fourth school years. A number of these children have been examined in accordance with the Binet-Simon diagnostic tests. An account of this work may be expected in the annual report of the superintendent, which is published early in the current year.

The Dental School of the University of Pennsylvania will participate in the examination of the teeth of Philadelphia school children. Dr. Robert R. Parks, instructor in the Graduate School, has charge of the work in West Philadelphia, and is assisted by 65 dentists and 35 seniors of the Graduate School.

The Harvard Student Council has been reorganized with a larger and more representative membership, including as many as possible of the varied college activities. It will be composed of the four class presidents, captains of the four major athletic teams, presidents of the five important college papers, the vice-president of the Harvard Union, three representatives from the Phi Beta Kappa and 24 members elected from the college at large. There will be an executive committee of seven members. The powers of the new council are such that its inauguration practically means the beginning of student government at Harvard.

The recent award of scholarships at Harvard University would seem to substantiate ex-President Eliot's old contention that the facts, "so far as they go, tend to prove that the product of the public schools has more character and power of work" than the product of

private preparatory schools. Of the 178 first and second group scholars, only seven men had been fitted for Harvard at Groton, Middlesex, Pomfret, St. George's, St. Mark's or St. Paul's.

The establishment of a department of pedagogy at Swarthmore College is now assured. The board of managers has accepted the \$15,000 raised for this purpose by the Friends' General Conference, and has set aside an additional sum sufficient to make the endowment of that department \$70,000. The opening of the department will be postponed, however, until the new endowment fund of the college is completed. In view of the prospective facilities for instruction in pedagogy, the other departments have formed tentative plans for the organization of four-year courses designed specifically for the training of teachers.

The October number of the *Rivista Pedagogica* contains an interesting account of experimental psychology in the University of Rome. In Italy, as in France, psychology has been more of an applied science than in this country or in Germany, and the applications have been chiefly to the problems of the abnormal consciousness and of pedagogy. Indeed, it was only after a long and arduous struggle with the supporters of the old rational psychology that Prof. Sante de Sanctis was permitted to open a laboratory for experimental psychology in 1907 in the psychiatric clinic of the university. During the same year a course in experimental psychology applied to pedagogy was offered to graduates of normal schools. The laboratory contains a limited equipment of apparatus, which is gradually being increased, and has so far been used chiefly for teaching purposes. Several interesting research problems, however, are now under investigation.

The day would seem not far distant when South Africa will have a great teaching university, adequately endowed and equipped. At the ceremonies attendant upon laying the cornerstone of the new university hall at Cape University, according to *Science*, hopes were expressed for a union of all South African educational interests in the establishment of such a university, and it was announced that wealthy South Africans had made contributions which would raise the endowment to over \$2,500,000.

We are in receipt of a prospectus of "A Cyclopaedia of Education," edited by Paul Monroe, Ph.D., to be published by the Macmillan Company in five volumes, \$5 each. This is a truly monumental work, worthy to take rank by the side of Rein's great *Encyclopaedisches Handbuch*. The 150 contributors to the first volume are men of the greatest eminence in the educational profession, and guarantee to the undertaking the stamp of the highest authority. "The scope of the work is such that it will include a concise discussion of all topics which are of importance and interest to the teacher, and will give the necessary information concerning every division of educational practices essential to a book of reference."

*The Journal of Education* (London), December, 1910, says: "We are concerned here only to report facts—not to justify a policy. The Prussian Kultusminister, in a circular dated September 10, removes doubts that had arisen with regard to the status of the married woman as teacher. 'There need be no hesitation to insert forms of appointment for women teachers, and in regulations for their payment a clause to the effect that the fixed appointment of a woman comes to an end with the day of her marriage, unless the local circumstances of the school render it advisable to keep her until the end of the school half year. A postponement of her retirement beyond that time is in no case permissible. But by this rule no restriction is put on the right of the educational authority to entrust a married woman with the office of a teacher under the form of a revocable appointment.'

"There are, I think, two main reasons why the married woman is absolutely essential for the work of education if education is to mean anything beyond a name. In the first place, the married woman is the normal woman, leading the normal life, and thus can give to those who come under her influence more desirable atmosphere and ideals than the single woman; in the second place, the married woman, speaking generally (there are always some exceptions to every proposition), knows, far better than the single woman can, the wants, needs, desires and habits of young and growing children, and, therefore, is the person who should be allowed to deal with these. I do not touch on another vital matter, except to mention it in passing—the fact that for all work we should aim at getting the best person, irrespective of any other consideration, and that the question of marriage

is really irrelevant in one sense; yet, if it can be proved that what I have said above is true, then the married woman will most often be the best fitted for the work."

The New York Branch of the American Psychological Association will hold its mid-winter meeting at Columbia University, Friday and Saturday, February 3 and 4. In view of the fact that many Eastern members of the association were unable to attend the national meeting, it seems possible that this meeting of the New York Branch may appeal to a wider constituency than usual. All members and others interested are cordially invited to attend. Among those who have signified their intention of being present from a considerable distance are Professors Angell, Jastrow, Judd and Pillsbury.

In our November number we called attention to the Conference on the Moral Phases of Public Education, to be held at Teachers' College, Columbia University, February 16 and 17. Among the topics to be discussed are "Legal Provisions for Moral Instruction and Training in the Various States," Prof. G. D. Strayer; "The Training of Teachers for the Work of Moral Instruction and Training—Report on the Training Now Provided by Normal Schools and University Departments of Education," Prof. W. C. Bagley; "The Practice of the Schools in the Different States, with Especial Reference to New Experiments," fourteen speakers; "A Comparison of Methods of Moral Instruction and Training," four speakers; "What Advance Steps Should Now Be Taken?" report of a committee. The conference is not open to the public.

The Fourth International Congress for Home Education will probably be held in the United States. A commission has been appointed, with Prof. Will S. Monroe, State Normal School, Montclair, N. J., as secretary, to take the matter under consideration.

The Fifth Congress of the American School Hygiene Association will be held at the Academy of Medicine, in New York city, on February 2, 3 and 4.

Professor Whipple's *Manual of Mental and Physical Tests* is arousing favorable comment in England and on the continent. Lead-

ing English journals, notably *School Hygiene*, have given it extended and laudatory notice, and Professor Meumann of Leipzig has made overtures for the translation of the work into German.

At the joint meeting of Section I. of the American Association for the Advancement of Science with the American Federation of Teachers of the Mathematical and the Natural Sciences, held at Minneapolis, December 29, Prof. E. L. Thorndike presented a paper on "Methods of Testing the Efficiency of Science and Mathematics Teaching."

Prof. M. V. O'Shea of the University of Wisconsin has again been appointed chairman of the American committee of the International Congress on Childhood and Youth. The next session of the Congress will be held in the United States, probably at Washington, D. C., in 1912.

At the Minneapolis meeting of the American Psychological Association Prof. C. E. Seashore of the University of Iowa was elected president, and Prof. W. V. D. Bingham of Dartmouth College, secretary.

The professors of the Paris Medical College have nominated Dr. Dejerine, professor of medical pathology, to the clinical chair of diseases of the nervous system at the Salpêtrière. This position, once held by Charcot, was recently occupied by Professor Raymond, who died last September.—*Science*.

Miss Isabel Camp, associate professor of pedagogy at Normal College, New York City, has resigned on account of ill-health.

On the nomination of the Medical Faculty of Columbia University, Dr. Frederic S. Lee, now research professor of physiology, has been appointed head of the department of physiology, to succeed Prof. John G. Curtis, retired.

The second annual session of the New York State teachers of educational psychology will be held at Teachers' College, Columbia University, Thursday evening, April 20, to Saturday noon, April 22. Details of the program arrangements will be announced later.

## CURRENT PERIODICALS.

(In this section only such articles will be noticed as bear directly or indirectly upon the interests of this Journal.)

THE PSYCHOLOGICAL CLINIC. S. L. HEETER. *Conservation of Health in the Schoolroom*. Vol. III, 121-124. In this article all the responsibility for the physical environment of the pupil—school grounds, buildings, sanitation, heating, ventilation, etc.—is placed upon the school authorities. The teachers are charged with the duty of looking after the physical and mental development of the child, and should detect mental and physical defects which might tend to undermine health or retard progress in school work. MARY BELLE GREENE. *A Class of Backward and Defective Children*. Vol. III, 125-133. Miss Greene reports on what she has accomplished in a class for backward and defective children in Philadelphia. The article presents results of intelligent application of methods adapted to individual requirements. The results obtained constitute a strong plea for individual treatment of defectives by intelligently trained teachers provided with adequate supplies. CHARLES A. A. J. MILLER. *Progress and Retardation of a Baltimore Class*. Vol. III, 136-140. Dr. Miller presents a study of records made by a class of 43 pupils from September, 1901, to the end of the year 1908-09. He points out some reasons for retardation and elimination that have effected the members of this class, and protests against some comparisons that have been made between school systems without considering the diverse conditions to be met. The study is of special value, in that it follows the same children for a period of years. ALBERT E. TAUSSIG. *The Prevalence of Visual and Aural Defects Among the Public School Children of St. Louis County, Missouri*. Vol. III, 149-160. This investigation was limited to the study of the prevalence of impaired vision, defective hearing and well-marked adenoids. The report gives total percentage of children thus affected, influences of sex and age upon these defects and the bearing which they have upon school progress. He concludes that State-wide, systematic medical inspection and uniform method of tabulating statistics are necessary. ALVIN E. WAGNER. *Retardation and Elimination in the Schools of Mauch Chunk Township*. Vol. III, 164-173. The writer finds that a very large percentage of those leaving school were progressing at a subnormal rate, and that the causes of retardation are exceedingly varied and complex, and urges our schools to devote more time to developing the physique, the forming of good habits and the instilling of high ideals while making the curriculum more vital by bringing

it closer to the lives of the pupils. LIGHTNER WITMER. *A Monkey with a Mind*. Vol. III, 179-205. Professor Witmer has tested a remarkable chimpanzee in his Psychological Clinic, and asserts that it evidences more intelligence than that possessed by any animal hitherto reported in the annals of science. He states that it gave every appearance of possessing determination, courage and self-directed interest, and that he is prepared to believe that its proficiency is not so much due to training as to genuine self-education. Reasoning, writing, articulating and comprehension of language are among the accomplishments attributed to the animal. It is to be borne in mind that, as the author states, this ape is an exhibition animal, and hence its education is subject to interpretations similar to those placed upon the performances of trained horses, dogs, etc. OLIVER P. CORMAN. *Size of Classes and School Progress*. Vol. III, 206-212. This study indicates that the medium-sized classes progress more rapidly than the smaller or larger ones; that small numbers are an advantage in the lower grades and large numbers in the higher grades, and that classes of larger membership rank highest in conduct. Classes with special teachers are held to be advantageous to the defective children, but mass instruction is asserted to be an ideal which is advantageous from a pedagogic as well as from an economic point of view. EDWARD C. KIRK. *The Dental Disabilities of School Children*. Vol. III, 217-223. The article maintains that education, inspection and treatment along the lines of dental and oral hygiene would ward against most dental diseases and many of their consequences, as well as promote physical development and mental efficiency. ALICE C. BOUGHTON. *Penny Luncheons*. Vol. III, 228-231. It is the aim of the association herein reported to provide wholesome food, prepared and served within the means of the poorest children in the city. The study outlines the plan of the work accomplished, lists the foods provided and gives the caloric evaluation of each. EDWARD L. THORNDIKE. *Promotion, Retardation and Elimination*. III, 232-243 and 255-265. Basing his study upon the reports of over 100 cities and towns, together with those reported by Ayres in "Lag-gards in Our Schools," the author shows that the percentage of failures taken at the end of the year is inadequate to give a valid measure of the relative length of grades for the reasons that (1) it fails to take account of children who did the work of a grade in less than normal time; (2) the second or third failure of a pupil after two or three years in a grade is given no more weight than a first failure; (3) the percentage of failures is based on the number of pupils in a given grade at the end of the year, instead of those who reached the grade and attempted its work, and (4) the enrollment at the end of the year of grade one may include children who have not spent the "normal" time in the grade for obvious reasons. The author further discusses the principles of retardation as related to the course of study, to promotion and elimination, and concludes that there is no

evidence to support the belief that the retarding force is greater in the earlier than in the later grades, excepting the first grade. G. W. GAYLER. *Retardation and Elimination in Graded and Rural Schools*. IV, 40-45. *A Further Study of Retardation in Illinois*. IV, 79-82. Superintendent Gayler makes an elaborate and interesting comparison between graded and rural schools, with reference to the percentage and progress of retardation and elimination. In the second article he calls attention to the fact that a large majority of the retarded pupils are average pupils without physical defects and of ordinary intelligence. CARRIE R. SQUIRE. *Our Responsibility for Retardation*. IV, 46-53. In addition to mental inferiority, Dr. Squire recognizes the following causes of retardation: Late entrance, change of school, inefficient schools, illness, physical defects and language difficulties. LIGHTNER WITMER. *What is Meant by Retardation?* IV, 121-131. Professor Witmer, reviewing the general conception of retardation, with reference especially to the investigations of Ayres, Cornman and Bryan, concludes that any child is retarded psychologically if the functions of his brain are not developed up to the normal limit for his age, and that those children who are two years older than the normal age for their grade are pedagogically retarded. GEORGE S. SCHLEGEL. *The Reading Free Dental Dispensary*. III, 249-254. Dr. Schlegel describes the work of the Reading Dental Society, whose chief object has been to show the need of a free dental dispensary and to promote dental inspection in the public schools. ARTHUR HOLMES. *Can Infected Teeth Cause Moral Degeneracy?* IV, 19-22. In a typical case Dr. Holmes calls attention to the effect of general nervous irritations which frequently arise during the period of exchange of the permanent for the deciduous set of teeth. J. E. WALLACE WALLIN. *Medical and Dental Inspection in the Cleveland Schools*. IV, 93-108. Dr. Wallin reports that the Board of Education in Cleveland co-operated with the sanitation committee of the Chamber of Commerce in conducting a dental survey of the schools. It was found that 97 per cent. of the children required dental service. Following this revelation dental clinics, the first of the kind in the United States, were opened in the school buildings. GEORGE L. LESLIE. *Health and Development Supervision of the Public Schools of California*. IV, 33-39. The author describes fully the operation of the law recently passed by the Legislature of California establishing health and development supervision in the public schools of the State. CHARLES KEEN TAYLOR. *The Boy and the Cigarette*. IV, 54, 55. Professor Taylor calls attention to the large percentage of boys from 12 to 17 years old who smoke cigarettes, notwithstanding the laws which are supposed to regulate the sale of tobacco to boys. By comparison, he shows that the grades of smokers fall from 10 per cent. to 17 per cent. below those of non-smokers. WILFRED L. FOSTER. *Physiological Age as a Basis for the Classification of Pupils Entering High School, and Relation of*



*Pubescence to Height.* IV, 83-88. The author states that "about one-third of all the boys who enter the high schools in New York city are discharged during the first term." As a remedy for this appalling condition he recommends classifying the different grades, according to mental ability and development. ARTHUR HOLMES. *A Moral Imbecile or a Bad Boy: Which?* IV, 109-116. The author discusses the underlying causes and theories of moral degeneracy, and gives a number of illustrations to show how these are applied in the diagnosis of typical cases. ARTHUR HOLMES. *An Educational Experiment with Troublesome Adolescent Boys.* IV, 155-178. The author describes in detail a very successful experiment which was conducted in connection with the Psychological Clinic of the University of Pennsylvania, and shows how a group of troublesome adolescent boys was held together and improved. CLARA HARRISON TOWN. *The Training of a Case of Infantile Stammer.* IV, 136-140. The special feature in the method used by the author was to drill the stammerer on one consonant in all the positions in conjunction with every vowel and diphthong before passing on to the next consonant. By this method marked improvement was made, both in speech and in spelling.

THE JOURNAL OF ABNORMAL PSYCHOLOGY. Vol. V, No. 4, is devoted to the role of dreams in psycho-analysis. MORRIS PRINCE. *The Mechanism and Interpretation of Dreams.* 139-195. This exceedingly important paper suggests extensions of the Freud theory. GEORGE A. WATERMAN. *Dreams as the Cause of Symptoms.* 196-210. Relates several cases in which dreams resulted in symptoms of disease. ERNEST JONES. *Freud's Theory of Dreams.* 211-213. An abstract of the author's well-known article on this subject in the *American Journal of Psychology*, Vol. V.—No. 5. ERNEST JONES. *The Action of Suggestion in Psychotherapy.* 217-254. AUGUSTUS HOCH. *On Some of the Mental Mechanisms in Dementia Precoz.* ADOLF MEYER. *The Nature and Conception of Dementia Precoz.*

## PUBLICATIONS RECEIVED TO JANUARY 1, 1911.

(Notice in this section does not preclude a more extended review.)

MARTIN W. BARR, M.D. *Mental Defectives; Their History, Treatment and Training.* Philadelphia: P. Blakiston's Sons & Co., 1910. (Reprinted.) Pp. 368. \$4.

This is the standard American work on mental defectives, and is a reprint of the original edition, published in 1904. The first 13 chapters contain the history, classification and general discussion of mental defects, and the last eight are devoted to a more detailed description of illustrative cases. The book is richly illustrated with 53 full-page plates, and the illustrations add greatly to an understanding of the discussions of the text. The point of view is purely medical, and the conclusions are not always in accord with modern studies in heredity.

ALYS E. BENTLEY. *Child Life in Song and Speech.* New York: The A. S. Barnes Company, 1910. Pp. 24.

A manual on voice-training for children, based on the principle of co-ordinated rhythms of muscular action, as promulgated by Mrs. Lucia Gale Barber. Voice-training should involve the whole child in the fundamental bodily rhythms.

ALYS E. BENTLEY. *Tone Plays for Children.* New York: The A. S. Barnes Company, 1910. Pp. 7.

Contains suggestions for the use of the play instinct in developing free, open tones in children's singing.

A. BÜTTNER. *Zweierlei Denken: Ein Beitrag zur Physiologie des Denkens.* Leipzig: J. A. Barth, 1910. Pp. 32. M. 1.

An attempt to express both perceptual and conceptual thinking in terms of neurone activity. "The sole function of nerves is to conduct a chemical decomposition process from one end to the other. \* \* \* All psychic activities must be reduced to simple conduction processes, and the task of a scientific psychology consists in describing the whole of mental life in terms of neural conductivity."

JOHN KING CLARK. *Systematic Moral Education.* New York: The A. S. Barnes Company, 1910. Pp. vi, 225. \$1.

An outline of explicit moral education in the elementary schools. Part I deals with the art and science of giving ethical instruction,

and Part II consists of a series of lessons on ethical topics that concern the every-day life of the child. The detailed questions, which compose the syllabi of the 32 ethical topics considered, cannot fail to be helpful to the earnest, conscientious teacher.

GEORGE V. N. DEARBORN. *Moto-Sensory Development. Observations on the First Three Years of a Child.* Baltimore: Warwick & York, Inc., 1910. Pp. 215. \$1.50.

Of all the many studies of child-development that have been published since the appearance of Preyer's work, this is the first to come from the pen of a professional physiologist. The work is, therefore, not merely a narrative of behavior, but also a scientific study of the establishment of motor co-ordinations. The accounts of Preyer, Shinn, Major and others are referred to and compared, and the reactions are discussed in the light of the most recent physiological investigations. The value of the book is enhanced by a detailed chronologic epitome of the observed development, an alphabetical list of first appearances and an index.

ERNEST NORTON HENDERSON, PH.D. *A Textbook in the Principles of Education.* New York: The Macmillan Company, 1910. Pp. xvi, 593. \$1.75 net.

The author presents the outlines of a theory of education from the point of view of evolution. In doing this he makes full use of recent studies in heredity, in psychology, and in comparative behavior. Part I, dealing with education as a factor in organic and social evolution, treats of readjustment, heredity and education, and the social aspects of education. Part II discusses the process of education in the individual, and embraces such topics as recapitulation, learning by trial and error, conscious learning, rational education, formal discipline, imitation, language and play. Part III describes various educational agencies, and points out the function of the school. It is, indeed, a hopeful augury for education that the results of modern scientific research are thus so masterfully applied to the discussion of educational problems.

GRACE HELEN KENT, A.M., AND A. J. ROSANOFF, M.D. *A Study of Association in Insanity.* Reprinted from the *American Journal of Insanity*, 67: Nos. 1 and 2, 1910. Pp. 142.

A list of 100 words was chosen, and the reaction of the observers to each of these words was recorded. No effort was made to take the reaction time. In order to obtain a normal standard the reactions of over 1000 normal subjects was first taken, and the fact was established that there is an almost universal tendency to respond to a given stimulus word by one or another of a small group of common reactions. Two hundred and forty-seven pathological subjects

showed a much higher percentage of individual reactions, yet there was no sharp dividing line between the normal and the abnormal, but rather a gradual transition from the one to the other. In certain pathological states characteristic associational tendencies were observed.

*Report of the Commissioner of Education for the Year Ended June 30, 1910.* Vol I. Washington: Government Printing Office, 1910. Pp. 662.

In addition to the Commissioner's introduction, which presents in condensed form a survey of educational activities in the United States during the past year, some of the more important chapters include educational legislation, industrial education, agricultural education, the Prussian system of vocational schools, education in France, in Central Europe and in Great Britain and Ireland.

G. E. SHUTTLEWORTH AND W. A. POTTS. *Mentally Deficient Children: Their Treatment and Training.* Third edition. Philadelphia: P. Blakiston's Sons & Co., 1910. Pp. xviii, 236. \$2 net.

The most popular and authentic English work on mental defectives. The new edition has been carefully revised and brought up to date, so that some account is taken of recent studies in eugenics. The chapter on educational training, while totally ignoring any psychological point of view, contains many interesting and valuable hints for the practical worker. In general, the tone of the book is medical, with a good, strong, common-sense bias.

Peter J. J.

## THE NEW CLINICAL PSYCHOLOGY AND THE PSYCHO-CLINICIST.

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[NOTE.—The first section of this paper discusses the function of the psychological clinic in universities, medical schools, hospitals for the insane, institutions for the feeble-minded and the epileptic, and in juvenile courts. The second section, with the bibliography, which will appear in our next issue, treats of the clinical method in the service of the public school.—EDITORS.]

Scientific psychology is essentially a modern creation. It is only about a half century since the scientific methods of induction and experimentation were systematically applied to the study of mental phenomena. Yet we possess, after this brief half century of labor, not only a fairly complete body of reliable *theoretical* psychology, but the promising beginnings of a number of *applied* psychologies. The methods and results of the new psychology have been applied, with gratifying results, during the last decade or two to the study of problems in history, literature, art, anthropology, sociology, economics, business, hygiene, medicine, insanity, feeble-mindedness, criminology, law, education and pedagogy. Its services thus far have been most valuable, perhaps, to education and medicine, and the outlook in these fields justifies the expectation that we shall soon have to christen two independent sciences—the science of experimental pedagogy and experimental psychopathology (with psychotherapy).

In the present paper we shall discuss one of the most promising of the recent applications of psychology, namely, the new psycho-clinical movement, which has won recognition, within a decade, in a number of universities, hospitals for the insane, institutions for the feeble-minded and epileptic, juvenile courts and public schools.<sup>1</sup> The discussion will pertain more particularly to the educational aspects of the movement—the psycho-clinical work in the schools.

### 1. *The psychological clinic in the university.* Dr. Lightner

<sup>1</sup>Unfortunately we cannot yet chronicle the inauguration of psycho-clinical work at any of the immigration stations of the country, although they are admitting annually thousands of morons and imbeciles who will soon become public burdens. All suspected mental defectives should be mentally examined and excluded if found feeble-minded.

Witmer, to whom we owe the phrase clinical psychology,<sup>1</sup> is the pioneer psycho-clinician in connection with university laboratories of psychology. His interest in the phenomena of mental retardation began in 1889, when his attention was drawn to a boy who suffered from retardation through speech defect; but it was not until the spring of 1896 that he opened the Psychological Clinic of the University of Pennsylvania and received his first case, a chronic bad speller (25, 26). Since that time Witmer's work has continued uninterruptedly and has grown apace, so that three hours daily are now (since 1909) devoted to the examination of children. These children come not only from the public and private schools and juvenile courts of Philadelphia, but from adjacent cities and adjoining States. Through the medium of correspondence, teachers and parents throughout the State of Pennsylvania may receive advice, and members of the staff are prepared to address teachers and school directors in any section of the State. Witmer's work embraces a physical, psychological and sociological examination, in which a number of experts co-operate—a psychologist, neurologist, dentist, oculist, nose and throat specialist and social worker. The social worker makes a first-hand examination of the child's home conditions, renders aid in the mitigation of bad environmental influences, and by means of "follow-up work" sees that the treatment prescribed for the child is carried out. Not only does the clinic address itself to diagnosis, but an orthogenic home school, or "hospital school," has been established for medical and pedagogical treatment. This is a combined home, hospital and training school, where the child is provided with proper food, baths, outdoor exercise, sleep, medical attention, discipline, motor training and intellectual drill in the rudiments of the school fundamentals. This school also serves as a school of observation and a clinic for further diagnosis. A system of records of the hereditary and family history and the child's personal his-

<sup>1</sup>Clinical psychology is not synonymous with medical psychology. Clinical means literally bedside, and was applied originally to the first-hand bedside method of studying the individual patient. In psychology it designates the method of determining the mental status of an *individual* child by first-hand observation, testing and experiment. It may be used in the study of normal as well as of abnormal mentality. We may suggest the use of the words *psycho-clinical* and *medico-clinical* to designate, respectively, psychological and medical examinations by the clinical method.

tory (accidents, diseases, educational record, present mental and physical status) is preserved for reference. Courses in the clinical method are offered to teachers during the regular and summer sessions. Witmer also edits *The Psychological Clinic*, now in its fourth volume, which is devoted to the study of the psychology, hygiene and education of children who are mentally and morally deviating.

Within the last few years psycho-clinical work has been started in New York University (where, during the last year, a course for the clinical examination of retarded children was organized by Dr. T. M. Balliet in the School of Pedagogy and offered by Dr. Goddard), Clark University and the Universities of Washington (by Drs. E. O. Sisson and H. C. Stevens), Minnesota and Pittsburg (by Dr. White). The University of Washington has just come into possession of \$30,000 from the Bailey and Babette Gatzert Foundation of Child Welfare, which will enable its psycho-clinical laboratory to extend its usefulness. A State-wide movement in behalf of the study and treatment of defective pupils is planned, to embrace at present all the larger towns of the State and ultimately the schools of the more sparsely settled districts as well. Lectures are being offered in a number of institutions—Columbia (by Dr. E. L. Thorndike and Dr. Naomi Norsworthy), Cornell (where a course of this character has been given by Dr. G. M. Whipple<sup>1</sup> during the past six years), Teachers' College (St.

<sup>1</sup>In a personal communication, Dr. Whipple informs me that he plans to open a clinic at Cornell next year, to be devoted particularly to the study of the *supernormal* child. No type of child has, perhaps, been so thoroughly neglected as the child on the *plus* side of the curve of efficiency. This is probably largely due to the fact that "accelerated" children are not nearly so numerous as retarded children, as shown by the few available surveys, and to the fact that they do not encumber the machinery of the schools as do the retarded pupils. But the supernormal or precocious child is the incipient genius; and it is chiefly through the productions of its genius that civilization advances. Both of the extreme types of the "special" child merit special study and treatment: the *subnormal* child, in order that he may be relieved, so far as possible, of his physical and mental handicaps, so that he may become as little of a burden to society as possible; and the *supernormal* child, in order that he may be surrounded with those conditions which, on the positive side, make for the freest and largest development of his potentialities, and which, on the negative side, will not serve to distort, abort or repress his natural powers. Since it is probable that most of the new laboratories which will be established will be dedicated to the study of the subnormal child, it is well that a laboratory be established with the express and exclusive aim of studying the supernormal child.

Louis), the Brooklyn Training School for Teachers, the Montclair (N. J.) State Normal School (by Dr. Will S. Monroe), and probably in other institutions—but these are not strictly clinical courses.

Now that we have a clinical technique—not complete, yet sufficiently accurate to do effective work—the time cannot be far distant when every university in a populous center will have one or two clinical laboratories in psychology. One of these laboratories, to be connected with the department of psychology or the school of education, preferably the latter, should be dedicated to the clinical examination, diagnosis and treatment of the exceptional school child—the individual suffering from temporary mental retardation or permanent deficiency. The lion's share of the clinician's time should be devoted to actual clinical work, the examination of cases and to the training of experts in the clinical methods. Students in training should not only attend the clinics as spectators, but also conduct clinics of their own with a minimal number of defective and deviating children of various kinds. The training should qualify them to become expert examiners. The clinical course should also be a required course for all students in university schools of education and normal schools who are fitting themselves to become teachers in special classes and special schools. The lecture courses offered by the director of the clinic would cover the technique of examining children, and the psychology and pedagogy of mental deviation—courses which ought to be given in all large city normal schools. What the clinical work should embrace will be indicated briefly in our discussion of the public-school clinic. To outline the course in the psychology and pedagogy of mental deficiency would lead us too far afield.

2. *The medical-school clinic in psychology.* The second university psychological clinic should be in the medical school. Its courses should be prescribed for all students specializing in psychiatry—in the psychopathology and psychotherapy of human afflictions. It is a lamentable fact, to which recent medical writers have adverted (thus Jones, Munro and Taylor: 13, 15, 16), that so overmastering has been the influence of traditionalism in the medical teaching of the day that it is



possible to graduate in any medical school of the country without the slightest technical knowledge of psychology. The only exceptions found are instances of college graduates who have taken a required general course in psychology while at college. "Most physicians are given not five minutes' training in psychology in the five years of their student life. There is no teacher of clinical psychology in any medical school in the country." (Jones.) The only thing that has saved the profession in this situation is the fact that many physicians are endowed with considerable native psychological insight and aptitude for psychological analysis.

But the situation is anomalous in view of the indubitable dynamic rôle played by the malfunctioning of mental complexes in the production of various neuroses and psychoses, and in view of the undoubted rôle that the mental factor plays in therapeutics (psychotherapy). The relation of the mind to disease has been established by the researches of Freud and Jung and their followers, by the clinical observations and results of Dubois (3) and of other medical practitioners, and by the net results, however distorted, exaggerated and unreliable most of the reports are, of healing cults of a pseudo-scientific character (17).

Among the disorders which are now known to be largely psychogenic in origin are the neuroses proper (neurasthenia and anxiety neuroses, both related to disordered sexuality), the psycho-neuroses (classical or Freudian conversion hysteria, anxiety hysteria and compulsion neuroses, all related to suppressed yearnings or wishes of a sexual nature), the lighter forms of hypochondria and melancholia, and various disequilibrations bordering on insanity. Since the pathology is psychogenic, the treatment of these disorders must be essentially ideogenic. It will consist in the modification of the patient's stream of thought, his associative mechanism, emotional complexes and attitudes, by the method of suggestion or of psycho-analysis. Whatever efficacy physical agencies, "healing thoughts," or "absent treatment," possess in the treatment of the true psycho-neuroses comes from the force of suggestion: the innate impulsiveness or tendency of ideas to express themselves in physiological adjustments or glandular

activities (the law of dynamogenesis). Now, there is nothing occult in scientific suggestion; it is a legitimate division of psychology and medicine. It is an art that requires developed skill for its best exercise. The successful operator must be, first and foremost, a medical psychologist; he must be able to inspire confidence by his manner and by a correct diagnosis and prognosis, to awaken hope by emphasizing the favorable symptoms throughout the course of the treatment, to remove conflicting thoughts and suggest appropriate thoughts, to bring to the surface and to dissipate psychic complexes which cause mental strife, etc. Medical suggestion should not be left to chance observers, as has been done. In psychotherapy "the public has been left largely to its own devices, to become the victims of Christian Scientists and dabblers in the occult, or, occasionally, the sacrificial offerings of well-intentioned but misguided clergymen." Various forms of mental affliction which have baffled medical skill have been left to untrained empirics and irregular practitioners, because medical curricula have not been adapted to the new demands of changed social and industrial conditions. In consequence we are now reaping a harvest of pseudo-psychotherapies.

If, now—to base an argument merely on one point—suggestion<sup>1</sup> is the basal principle in psychic treatment, and suggestive therapeutics is a legitimate branch of psychology and medicine, the conclusion follows that every complete medical school should make provision for instruction and training in the science and art of psychological medicine. One of the divisions in this department should be a laboratory of clinical psychology, in which the student may receive training in the psychoclinical and psycho-laboratory methods of examining patients; in the methods used for testing amnesia, retardation and the extent of the involution changes resulting from various dementias; in the psycho-analytic<sup>2</sup> and association-reaction meth-

<sup>1</sup>It is possible that the method of psycho-analysis, by means of which suppressed desires are released by being made conscious, may some day attain equal importance. In suggestion the desires are liberated or displaced by verbal cues or by the arousal of certain affective processes.

<sup>2</sup>For a recent statement of Jung's method of psycho-analysis, with bibliography, see Chase, *Psychoanalysis and the Unconscious*, Pedagogical Seminary, 17: 1910, p. 281f.

ods of mental diagnosis, possibly supplemented by psychomotor or galvanometric tests,<sup>1</sup> and in the psychological and therapeutical aspects of suggestion, hypnotism and allied phenomena. By means of these methods we may hope to lay bare dormant, unrecognized, unconscious mental complexes, disorders and blockages in the associative mechanism, tendencies toward repetition or preservation of test words, sensory automatisms, dissociation phenomena, obsessions, fixed ideas and phobias, experimental criteria of confusions and a differential psychology of various psychoses. These facts will in time attain a diagnostic value which they do not yet possess.

3. *The psychological clinic in the hospitals for the insane.* In contrast with the medical schools the new movements in the medico-clinical applications of psychology have taken a firm hold upon institutions for the insane, feeble-minded and epileptic. In hospitals for the insane practically all of the recent work of value in psychiatry has been done by psychologists or by alienists trained in the methods and imbued with the spirit of the new psychology. The pioneers in the new psychiatry are Wernicke, who, to be sure, recognizes the paramount importance of etiology in the consideration of mental diseases, but finds it inadequate for classification, and who makes the disorders of the content of consciousness primary (from him we derive the concepts of psychosensory, intrapsychic and psychomotor disorders; allopsychoses, somatopsychoses and autopsychoses; afunctional, parafunctional and hyperfunctional disorders); Ziehen, whose classification is thoroughly psychological (based upon the Herbartian and association psychology); Kraepelin, who employs the methods of psychological experimentation, the longitudinal method of analysis of the stream of consciousness (sequential course) for making a composite picture of the distinctive traits of various disease types; and Freud, who makes use of the method of psycho-analysis for purposes of diagnosis and prognosis. These German movements in psychiatry are represented here by Dr. Adolf Meyer, now at the Johns Hopkins Hospital; Dr. August Hoch,

<sup>1</sup>It is appropriate to state that the import of the phenomena of galvanometric deflections is still in dispute.

at the Ward's Island Psychiatric Institute (both of these psychiatrists have done notable work along Kraepelinian lines especially), and Dr. Ernest Jones of the University of Toronto, who is an exponent of Freudian methods. Psychological research is also being prosecuted at the McLean Hospital, Waverly, Mass. (until recently by Dr. F. L. Wells, now at the Ward's Island Psychiatric Institute); at the Government Hospital for the Insane, Washington (by Dr. S. I. Franz); Friends' Asylum for the Insane, Frankford (by Miss Clara H. Town); Kings Park Hospital, New York State (by Dr. A. J. Rosanoff); the New York Infirmity for Women and Children (by Dr. Boris Sidis), and probably elsewhere (in this connection the work of Drs. Morton Prince, A. A. Brill, T. A. Williams and I. H. Coriat deserve mention).

4. *The psycho-clinical laboratory in institutions for the feeble-minded and epileptic.* The initial impulse toward the organization of laboratories of psychological research in these institutions came from Dr. A. C. Rogers, who, in 1898, engaged a medical man with a psychological training (Dr. A. R. T. Wylie) to devote about half of his time to the psychological study of the patients of the Minnesota School for Feeble-Minded and Colony for Epileptics at Faribault. The fruits of Wylie's work, which continued for about three years, appear in a number of studies of the emotions, instincts, senses, memory, reaction time, height and weight of the feeble-minded.

The main impulse, however, toward the development of the work came from Prof. E. R. Johnstone of the New Jersey Training School for Feeble-Minded Boys and Girls at Vineland. He launched the movement in 1906 by the appointment of Dr. H. H. Goddard as director of research. The work in Goddard's laboratory has progressed uninterruptedly during the last four years, and has covered a wide range of interests in psychology and heredity. The department at present commands the services of a director, two assistants and four heredity field workers. The laboratory is not only an institute of research, but also a seminary of instruction. During the summer it offers training courses in clinical psychology to teachers of retarded and subnormal children. Similar courses were offered during the months of February, March and April

this year. The result of the Vineland work is appearing in a number of studies of the psychology and heredity of feeble-mindedness—growth curves, percentile curves of height, weight, vital capacity, hand dynamometry, endurance, heredity charts, record forms, translations of graded tests for developmental diagnosis (7, 8), etc. The laboratory has a fair equipment of apparatus and a well-chosen library of technical periodicals, domestic and foreign. The Vineland laboratory is not only the first genuine laboratory of clinical psychology to be established at an institution for the feeble-minded, but it is second to none, in this country or elsewhere, in respect to the influence which it has exerted in its special field.

Within the last year four departments of psychological research in institutions for these defectives have been organized. In the fall of 1909 a laboratory—the second of the sort in the country—was established on the recommendation of Dr. H. G. Hardt in the Lincoln State School and Colony of Illinois, under the directorship of Dr. E. B. Huey (10, 11). In the fall of 1910 the Faribault laboratory was re-established, with Dr. Fred Kuhlmann as director, and two new laboratories were established, one at the Iowa Institution for Feeble-Minded Children at Glenwood by Dr. George Mogridge, under the directorship of Prof. P. F. Lange, and one in the New Jersey State Village for Epileptics at Skillman by Dr. D. F. Weeks. The latter is the pioneer psycho-clinical laboratory in colonies for epileptics.

Institutional positions in psychological research offer certain advantages. The incumbent is relieved of teaching duties and has ready access to an abundance of clinical material. He may also count on the sympathetic co-operation of the governing and administrative officers of the institution, for the view is now gaining acceptance that the functions of hospital, custodial, correctional and penal institutions should not be limited to the care, treatment and restraint of the inmates, but should include the scientific investigation of the present mental and physical status of the defectives, and the conditions and causes which underlie various kinds of defectiveness and delinquency. Public institutions should be laboratories of research as well as places of treatment, refuge or confinement.

In order to be made attractive centers of scientific research, however, the prerogatives and regulations affecting the research positions (in respect to the matter of stipend, rank, hours of service, vacations, publishing rights, personal prerogatives, freedom from unnecessary restrictions, etc.) should be made to conform with the rules which govern similar positions in the universities and research institutions. Only thus will the best scientific talent find the field sufficiently attractive to forsake the scientific, cultural, library and laboratory advantages which the universities furnish in such rich measure. At the present time the universities have practically a monopoly on the scientific producers of the country. According to Cattell's statistical study of American men of science, 75 per cent. of the 1000 scientists of the first rank are located in the colleges and universities (2). There is an inviting virgin soil for scientific investigators in institutions for defectives. Provided that proper inducements are offered, these institutions bid fair to become large productive centers of scientific work in the near future.

So far as psychological work is concerned, it is pertinent to point out that the function of the psychologist is to study mind in all its manifestations and under all its conditions. The psychologist should therefore have the freedom of the institution; he should have ready access to the patients in the cottages or schoolhouse or in the field, no less than in the laboratory. There is a certain artificiality and formality about psycholaboratory work, a certain unnaturalness in the attitude or the reactions of the subject toward the tests. This will sometimes render the results one-sided or partial, and therefore makes it desirable to do supplementary work under other conditions.

5. *Psycho-pathology in the juvenile court.* The application of the methods of clinical psychology to the study of the juvenile offender is just beginning. The department of child study and pedagogic investigation of the **Chicago** public schools has done incidental work in this direction in connection with the schools for truants and delinquents, but the first laboratory directly connected with a juvenile court is the Juvenile Psychopathic Institute, organized in Chicago two years ago by Dr. William Healy, who secured \$30,000 with

which to carry the work on for five years, which was deemed sufficiently long to demonstrate its value. Dr. Healy, with the aid of three assistants, is engaged in the study of the underlying factors, physiological, psychological and social, of criminalistic careers, and is working with the juvenile repeated offender. It is expected that this laboratory will be continued upon an enlarged basis and that similar institutes will be organized in the near future in a number of the larger cities of the country. The time is near at hand when our criminals and delinquents, juvenile or adult, whether in jails, prisons, reformatories, houses of rescue or detention homes, will be given individual study from the points of view of anthropology, medicine, sociology and of clinical and criminal psychology, and when the truthfulness of testimony and the veracity of witnesses will be tested by methods other than the crude method of cross-examination (16). The laboratory method of determining capacity for correctness of description and report will prove an aid to the jurist. Psychology is destined to contribute something toward making criminology and jurisprudence more scientific. When the methods of science have been applied to the study of the delinquent and criminal we shall be in a position to adapt the penalty, qualitatively as well as quantitatively, to the nature of the offender rather than to the nature of the offense. Frequently the roots of criminality lie embedded in a criminal neuropathic heredity, or in certain irresistible habits which have been engendered by vicious or criminal influences in the social environment, or in a diseased or physically malformed organism, or in an organism which is functionally maladapted to its physical and psychical environment. The rôle of the different causal factors must be rightly estimated for every individual offender before we can deal scientifically with the problems of crime and criminology. Our methods of criminal procedure have too long been on a par with that type of cure which treats effects, but ignores causes. The Binet-Simon and other psychological tests will aid the alienist and jurist in determining the mental status and responsibility of persons in commitment. The arrest or degeneration revealed by such tests will often be found to affect precisely those higher psychical powers without whose integ-

rity of function the individual cannot attain that standard of conformity to law demanded by his social environment. It will frequently be found that the arrest or atrophy of function is so serious as to produce permanent mental and moral maladjustment to the community ethical requirements. Offenses by such individuals are without conscious criminal intent. There is no immorality of intent, though there is immorality of act. Such individuals are, subjectively considered, unmoral, like the infant who cannot appreciate the distinction between right and wrong. None the less, they are a menace to society, and require permanent restraint as a protective, rather than a punitive, measure.

*(To be concluded in the April issue.)*



# THE MOST ECONOMICAL UNIT FOR COMMITTING TO MEMORY.

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## SUMMARY.

The question as to whether it is more economical, in committing to memory, to learn connected-sense material by parts or to learn it as a whole is here extended to longer selections than have been considered by previous investigators. Experiments occupying some six months, though mainly restricted to a single observer, show that, whether 5 lines or 240 lines of poetry are memorized, learning by wholes is, without any exception, more economical than learning by parts, and that the relative saving is much greater in the case of long selections that require more than a single sitting. Corroborative results were obtained from tests upon school children.

## I. THE PROBLEM STATED.

In 1900 Lottie Steffens (7) published the results of some experiments in committing to memory. The material used was nonsense syllables and Byron's *Childe Harold*. With the poetry she found that a stanza could be more economically committed to memory if taken as a whole and read clear through than if divided up and learned piecemeal. But she used no larger unit than one stanza. Later experiments (1, 3, 6) have, in the main, confirmed the earlier work of Steffens. Henderson (4), referring to the work of Steffens, says that the psychologist gives no rule as to the length of unit that is most economical to use in committing to memory. Ebbinghaus (2) says, without citing the authority, that "it has been proved that, in order to learn a long poem, monologue or piece of prose, this should not be divided into smaller parts. It is uneconomical to learn each stanza or sentence separately."

Will the rule hold good for long selections as well as short ones? Will it hold good for 100 lines or 200 lines as well as for 5 lines or 10 lines? We have undertaken to find whether there is any limit to the application of the principle of economy in learning by wholes.

## II. THE METHOD.

We have worked only with poetry, and have used units ranging from 5 lines to 240 lines. The work, so far, has required the committing to memory of some 2500 lines, and has extended over a period of some six months. Only one of the writers (J. C. S.) has been able to do systematic work, and therefore only his results are included in this report. His work was done under conditions as nearly uniform, perhaps, as it is possible to obtain. The learning was always done at the same time of day, and when the learner was not in good condition the learning was postponed for that day, except in the longer tests, where this was impracticable.

The material used was Longfellow's translation of Dante's *Divine Comedy*, entirely new to the learner. Material such as this is necessarily uneven; some parts are more difficult than others. This is always true in the use of meaningful material. The only material not open to this criticism is nonsense material. But it has been shown by several investigators that what holds true in the memorizing of nonsense material does not necessarily hold good in the case of meaningful material.<sup>1</sup> We

<sup>1</sup>We agree with Kuhlmann (5) that "more practical results would be obtained if the investigation of memory were made of the learning and memory processes just as they are found in the tasks of the school and in life." There is not one problem of memory, but many, and what holds with one kind of material does not necessarily hold with other kinds of material. Not only do results with meaningful material often differ radically from the results obtained with the use of nonsense material, but different types of meaningful material give often radically different results. In experiments conducted by one of the writers (W. H. P.) during the past year, with many different kinds of material, nothing was so striking as the difference of results that came from the use of different materials. To illustrate, one observer who stood lowest in the tests with nonsense material, with series of words and figures, and with objects and pictures, stood among the best when given material organized into connected thought.

therefore decided to use only meaningful material, and to offset this difficulty of unevenness by learning, as far as time would allow, many different sections of the same length by the same method, hoping to find the true tendency in the averages. Moreover, the introspections of the learner served as a check.

The method used was to read the poetry over aloud at an even, natural rate. As soon as the learner thought that he could repeat some from the beginning, he would do so, and when he came to a halt, would read on through to the end of the unit. It was found to be nearly impossible, on account of fatigue, to commit to memory by any method, at one sitting, a unit that could not be learned in 40 or 50 minutes. We arranged, therefore, to spread the learning of the longer units over successive days. For the 60- and 120-line tests, in the method of the whole, the unit was read entirely through for some 25 or 30 minutes on the first day, and on succeeding days was read through in the same way till learned. By the part method the unit was divided up into smaller parts, and these parts were learned separately.

There are evidently several procedures that can be used in the part method. The subdivisions of the unit may be kept learned up complete as the learning proceeds, *i. e.*, the first part may be learned the first day, and on the second day the second part learned and the first part relearned, and so on to the end, on each day relearning all the parts previously learned. Or, another plan is to learn a part each day and repeat once all the parts previously learned, and then at the end, after all the parts have been learned separately, to repeat the whole until it can be given from memory. The former plan was used with the 60- and 120-line tests, the latter plan with the 240-line test.

## III. THE RESULTS.

1. *Statistical results.* The numerical results of all the tests are shown in the accompanying tables:

TABLE I.

IMMEDIATE LEARNING TESTS (20 to 50 lines).

	Wholes. Min. Sec.	Halves. Min. Sec.	Thirds. Min. Sec.	Fourths. Min. Sec.	Fifths. Min. Sec.
20 lines.....	16 10 15 25 11 50 13 45	17 05 15 25 16 10 16 10			
Av.....	14 17	16 12			
25 lines.....	19 15 16 45 15 20 19 00 22 15		20 30 20 05		
Av.....	18 31		20 17		
30 lines.....	19 00 28 40 24 00	24 14 25 40			
Av.....	23 53	24 57	25 30	25 00	34 05
40 lines.....	40 10 33 20 32 20	42 55 32 15 31 25	40 10 49 50 36 30	38 10 43 15 36 25	32 45 41 00 40 10
Av.....	35 16	35 31	42 10	39 16	37 58
50 lines.....	47 30 41 10 43 00	45 30 47 35 55 30			
Av.....	43 53	49 31			

TABLE II.

TESTS OF LEARNING ON SUCCESSIVE DAYS.

*First 60-Line Test.*

Wholes.	Min. Sec.	Parts.	Min. Sec.
1st day.....	29 45	1st half on 1st day.....	28 40
2d day.....	37 00	1st half on 2d day.....	10 00
		2d half on 2d day.....	30 00
Total.....	66 45	Whole on 2d day.....	17 40
		Total.....	86 20

### Second 60-Line Test.

Wholes.		Parts.	
1st day.....	25 00	1st half on 1st day.....	24 00
2d day.....	35 30	1st half on 2d day.....	9 20
		2d half on 2d day.....	31 05
Total.....	60 30	Whole on 2d day.....	11 35
		Total.....	76 00

### 120-Line Test.

Wholes.		Parts.*	
1st day.....	41 40	1st section on 1st day.....	37 30
2d day.....	43 55	1st section on 2d day.....	8 45
3d day.....	54 00	2d section on 2d day.....	37 40
		2d section on 3d day.....	12 00
Total.....	139 35	3d section on 3d day.....	35 50
Saving.....	29 20	3d section on 4th day.....	10 40
		Repetitions on 4th day....	26 30
		Total.....	168 55

\*First section, 39 lines; second section, 42 lines; third section, 39 lines.

### 240-Line Test.

### A. Unit Method.

Day.	Time.		Repetitions.
	Min.	Sec.	
1	36	05	3
2	36	30	3
3	36	15	3
4	36	10	3
5	36	00	3
6	36	00	3
7	35	50	3
8	35	45	3
9	35	40	3
10	33	45	3

### B. Section Method.

Day.	Lines.	Time.	No. of Repts. (estimated).	Additional	Time.	Total Time
		Min. Sec.		Repetitions. Sections.		Min. Sec.
1	31	30 45	20	..	.. ..	30 45
2	29	24 30	16	1-2	3 00	27 30
3	29	27 15	18	1-3	4 25	31 40
4	31	33 30	22	1-4	6 00	39 30
5	32	30 00	20	1-5	7 30	37 30
6	31	31 45	21	1-6	8 55	40 40
7	30	34 00	23	1-7	10 45	44 45
8	27	23 20	17	1-8	12 05	35 25
Final repetitions of whole.						
9	240	36 05	3 (actual)	..	.. ..	36 05
10	240	36 15	3	..	.. ..	36 15
11	240	35 40	3	..	.. ..	35 40
12	240	35 35	3	..	.. ..	35 35
Total time.....						431 20
Average daily time.....						35 56

Total number of repetitions.							
Section.....	1	2	3	4	5	6	7
Repetitions.....	39	35	36	39	36	36	37
							30—Average 36

Summary for 240 lines:

Section method.....	431 min., 20 sec., 36 repetitions
Unit method.....	348 min., 00 sec., 29 repetitions
Saving by unit method.....	83 min., 20 sec., 7 repetitions

It will be seen from a study of the tables that, without any exception, the method of the whole is more economical than is the part-method, and that the saving is much greater in the case of the long units, which required more than one sitting. The greatest saving in the short units was about 11 per cent. in the 20-line and the 50-line units. In the longer units the saving was about 20 per cent. in one 60-line test<sup>1</sup> and 22 per cent. in the other, 17 per cent. in the 120-line test and 20 per cent. in the 240-line test.

An inspection of the table of results shows minor variations, due, doubtless, to differences in the difficulty of the material. In spite of these differences, however, it will be seen that in no case was the part-method as economical as the method of the whole, although in some cases, as in the 40-line tests, some of the part-method tests gave better results than did others in which larger divisions were used. Thus, for example, the division into fifths gave better results than the divisions into fourths or thirds. The introspective notes on these passages clearly reveal the fact that this result was due to the extreme concreteness of the material and the close thought connections in the part that was divided into fifths, as well as to the fact that the part divided into thirds was especially difficult. This instance would lead one to conclude that, in individual cases—in short units—the part-method might chance to be as economical as the method of the whole. Such an outcome would be

<sup>1</sup>The saving given in the first 60-line test is not quite fair, for, on account of fatigue, the learning by parts could not be completed on the second day, so that a third day had to be taken for the final repetitions. A just comparison would have required a relearning on the third day of the unit learned by the method of the whole.

found when concrete, closely connected material was used in the part method and difficult matter in the method of the whole. It is very doubtful, however, if material of the *same* difficulty would ever be learned in less time by the part-method.

This conclusion finds further support in some memory tests recently given to public-school children. In these tests one-half of the children learned a selection by the part-method and the other half learned the same selection by the method of the whole. The average time of those using the latter method was less than the time of those using the part-method. The selection used was Bryant's *To a Waterfowl*. These tests were conducted by Miss Ida E. Graham, a student in the University of Missouri. We hope to repeat the experiments with school children under more careful, methodical conditions.

2. *Introspective results.* The introspective records and notes made during the experiment throw much light on the experiment, and we summarize them as follows:

It is a loss of time to continue memorizing after fatigue sets in. This usually occurs between the 40th and 50th minute, and causes a large increase in the amount of time needed. Fatigue was revealed objectively by the fact that parts already learned tended to drop from memory. This dropping out occurred especially in the first 10 or 15 lines, and hindered the immediate learning of a long section. Fatigue hardly ever occurred in sections requiring less than 40 minutes, but in sections requiring more than 45 minutes it almost invariably occurred, and the longer the time needed for the learning of the section the greater was the difficulty. As the time increased, the difficulty spread over the whole section, so that it was found to be practically impossible to memorize 60 lines at one sitting. The associative connection between the divisions of a unit is more ideational than verbal, and in so far as it is verbal it is a connection between important words. Hence, if a section begins with unimportant words, the thought connection may be of little aid, and one must either rely upon the repetitions of the whole or single out the first word of the section and fix it in memory. One can recall the thought of the following division in certain cases without being able to reproduce it verbally, until the first word is supplied. Very often, however, backward association will supply the first word after a brief interval. The process of memorizing is aided by concentration upon the important words.

What is the psychological explanation of these results? Pentschew (6) summarizes the explanation of the more economical learning by the method of the whole as follows: "Zerstörung des Zusammenhanges; hemmende Assoziationsbildungen; mangelhaft eingeprägte Uebergänge; ein Vergessen bereits gelernter Abschnitte und dadurch entstehende Unlustwirkungen; Mechanisierung des Lernens ohne Vergewöhnung."

tigung des Sinnes; ungleichmässige Konzentration der Aufmerksamkeit und dadurch leichtere Ablenkung; ungleichmässige Verteilung der Wiederholungen und endlich unsicheres Reproduzieren und Schwäche des Behaltens." Of these factors, the ones that seemed most important in our memorizing were the following: (1) The interferences in association, particularly the association of the last line of a division, with the first line of that division instead of with the first line of the next division. (2) The forgetting of the parts already learned. In the memorizing of the shorter units the loss in the time in using the part-method seemed almost entirely due to the extra time at the end necessary to fix the divisions together; the sum of the times required for learning the separate parts is less than the time taken in the method of the whole. In the longer sections—those whose learning covered more than one day—another factor entered, namely, the subconscious fixing of the material in the intervals between the learning periods. That this process does take place is obvious from the introspective records. They show that in the learning of the 240-line unit by the unit method, on each day after the third the learner was able to repeat, without looking at the book, more than could be so given at the third repetition of the previous day. It will be observed that if the time for final fixing of the parts together in the learning of the 60- and 120-line sections be deducted from the whole time of learning, there is still a saving in favor of the method of the whole. This would seem to show that there was in operation in this case some factor not present in the learning of those shorter sections that could be learned at one sitting. This would doubtless have been true in the 240-line test if the same method had been used, but the method used in the latter was really a combination of the part-method and of the method of learning by the whole. It should also in fairness be said that in this long test there were accidental conditions favoring the part-method. On the night following the seventh day the learner lost considerable sleep, and did not recover from the effects for two days. On the last repetition of the seventh day he had to turn to the book only a few times, while on the eighth day, on the first repetition, he



had to refer to the book 10 times. Without this interruption the selection would probably have been learned on the eighth day. This subconscious fixing operated to the advantage of the method of learning by the whole, because on the first day of the test the unit was read entirely through three times, and thereafter the subconscious incubation helped to fix the entire selection in the intervals between study, while in the learning by parts it could help in fixing only the parts already learned. It would be interesting to have this long section done by other investigators for comparison of results. We used for this test, for the part-method, *Inferno*, Canto 16, Line 90, to Canto 18, Line 57, inclusive; for the method of the whole, Canto 18, Line 58, to Canto 20, Line 28, inclusive.

#### IV. GENERAL PEDAGOGICAL CONCLUSIONS.

As a general conclusion, we are doubtless warranted in saying that, in committing to memory any ordinary selection that one is ever likely to have to learn, the most economical procedure will be to read the selection through from beginning to end till it is learned. If the selection is too long to be learned at one sitting of about 45 minutes, it will be most economical to read clear through each time, and to devote 30 or 40 minutes at a sitting, the exact amount of time depending upon the condition of the learner. In the learning of longer selections (longer than we have used), the most economical procedure might be to divide the matter up into large units that in themselves made thought wholes, to commit these to memory separately, and then to commit to memory some device to hold together the separate parts.

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## THE SUPERNORMAL CHILD.<sup>1</sup>

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### I.

I can, in this paper, do little more than call attention, in a sketchy manner, to an educational problem that is without doubt destined to play a significant rôle in coming decades, though, thus far, we have made only a few sporadic and uncertain attempts to deal with it. Psychologically, we can divide mankind into three groups—the great mass of average or normal beings, the group that lies below, and the group that lies above this norm. What attitude does pedagogy take toward this classification?

For centuries we have had a pedagogy of normal children; indeed, until quite recently, pedagogy as a whole was well-nigh exclusively directed, both in theory and in practice, upon the average child.

Since a few decades we have had, also, a pedagogy of subnormal children, and we are justified in regarding all the efforts that have been made for the improvement and protection of the feeble-minded, the delinquent, the neglected, the degenerate and the blind and deaf as a brilliant tribute to the social progress of our times.

What we still lack, however, is a pedagogy of supernormal children, though this should not be deemed in any whit less important than that of subnormal children. To be sure, the number of individuals who would come under consideration in such a pedagogy seems relatively small, but the importance of an educational problem is not gauged by the number of individuals concerned therein. Systematic pedagogical measures, if applied to hundreds of supernormal children, might, under favorable conditions, bear more abundant fruit, both

<sup>1</sup>Translated, with the permission of the author, from the *Zeits. f. Jugendwohlfahrt, Jugendbildung u. Jugendkunde* (*Der Säemann*), February and March, 1910, by Lucy M. Day, Cornell University.

for the individual and for society, than does the ten times greater expenditure of energy that is devoted to thousands of subnormal children.

We may expect the further objection to be made that the subnormal represent a crying need in our social organism; that for them, accordingly, remedial measures are demanded; that so long as there are insufficient special schools for defectives we cannot think of special schools for the conspicuously able; and that, in comparison with such problems as the fight against criminality, neglect and degeneration among children, the plan of developing talent and exceptional intelligence seems rather a luxury.

This objection, however, is not sound. What is needed is not successive, but simultaneous action. A civilized country cannot, on account of the existence of poverty and need, give up such "luxuries" as museums and universities, or the encouragement of research or of art. No more should pedagogy forget, in caring for the inefficient, that those who deviate from the average in the other direction present their own problems and impose their own special obligations.

Pedagogically considered, the problem of the supernormal child has both an individual and a sociological phase.

On the one hand, we must consider the gifted individuals themselves. In them we must discern the promise of future worth of a special order, and our duty not to allow such worth to deteriorate, but to make every effort to bring it to its most complete realization, constitutes an obligation that, once realized, cannot be neglected by civilized society.

Nor must we content ourselves with the oft-heard commonplace: conspicuous talent succeeds by its own strength. Success requires, above all, great physical energy and strength of will, and these qualities may often be found in but a slight degree with exceptional talent, so that there is always danger that the talent may be wasted. Sometimes, moreover, external conditions are such that even the strongest will struggles in vain. After all, on what evidence is this common belief based? We know only those talents that have attained success. There is no book of epics to sing of potential greatness that has failed of fruition.

On the other hand, we must consider the advancement of

society, to the end that we may ensure to it a maximally developed class of intellectual leaders and representatives of culture. Any exceptional talent, potential genius or superior intelligence that remains undeveloped is a loss, not merely for the individuals themselves, but also for the progress of the nation and of humanity. Indeed, from a sociological point of view, we need a pedagogy of the supernormal as a counterbalance to the now flourishing pedagogy of the subnormal. A one-sided concentration of pedagogical effort on the protection and improvement of the class of lesser value must in time reduce the level of culture, if we do not at the same time strengthen and improve the class of greater value.

But what, then, do we mean by "supernormal?" This is a question that must be answered by psychology. A satisfactory answer is just now impossible, since scientific psychology is but just beginning to concern itself with the problem. We can advance only a few tentative propositions, such as are needed for the understanding of what follows.

In the first place, it is evident that we may not identify "supernormal" with "genius." True geniuses are so rare that we cannot construct a special pedagogy for them, and they are, moreover, less dependent than are other individuals upon specific educational influences.

We mean, therefore, by supernormality not something qualitatively *sui generis*, but the possession in quantitatively superior forms of capacities that are generally exhibited by individuals at large. Just where and by what criteria we must draw the line between the realm of the normal and that of the supernormal is a matter that must be left to future psychological research and pedagogical practice to determine.

We may state already, however, and with some degree of certainty, that the supernormal are divided into two groups—the specifically and the universally supernormal. In the first group some specific phase of mentality is especially strongly developed, while the other phases need not exceed, and sometimes may even fall short of, the normal level. These specific phases make up what we recognize as conspicuous talent or endowment. To this group belongs the exceptionally musical child, the artistically, the mathematically, the technically, the

linguistically gifted child. In the other group the supernormality embraces the entire mentality; not, indeed, in such a way that every phase is uniformly developed, but at least in such a way that a general superiority is manifested in the most diverse types of mental activity. Those who belong to this group are the great intellects. (The more exact investigation of possible differences, crosses and mixtures of the different forms of supernormality is another future problem for psychology.)

The pedagogy of the supernormal must cover all forms of supernormality; it must, to a certain extent, apply different programs to the different phases.

Let us next ask what attitude society now takes toward the supernormal child.

A great deal is already being done for these children. For poor public-school children who show conspicuous ability, whether generally or in special directions, there is an opportunity, thanks to free tuition and scholarships, to secure the training afforded by higher institutions, the university, the art school, etc. Institutions, societies and individual patrons are zealous in their efforts to provide the cost of an education, particularly of artistic training, for such especially promising youthful talent as they may chance to discover. But what a mere bagatelle is this in comparison with what might be done, and, above all, how fortuitous, how unsystematic, it all is! How uneconomically are these stipends, so meager in themselves, dispensed! In our sociological forms of charity we are, fortunately, past the phase of disorganized almsgiving, dependent on casual opportunities. In our care of the supernormal we are still in the midst of that phase.

A single illustration of this fact: A few years ago a prominent educator in Munich, Kerschensteiner, undertook his well-known experiments upon some 50,000 children of the public schools of that city. In these experiments the pupils had to make free-hand drawings of specified objects, both from memory and from nature. Among the drawings were found some of remarkable artistic merit, and these were found by Kerschensteiner to be, almost all, the work of children of very poor parents. Moreover, in most cases, this exceptional talent in

drawing had not been properly appraised by the school, and in some cases it had not even been noticed at all. Kerschensteiner saw to it that these children were assigned to art schools or to arts and crafts schools, where they found an opportunity to develop and realize their special gifts. But what would have become of these children had not Kerschensteiner chanced to make his experiment? And how much similar talent may smoulder unrecognized in other places where no one thinks of making such tests? And should we not expect similar discoveries of talent to result in any other place where like tests were made?

The school demands only a restricted range of activities of a special sort and it can all too easily overlook marked efficiency of other kinds. Or it even finds fault with the pupil who, in his work in the fields that do concern it, does not follow the beaten path laid down by its program, but is impelled to do "all sorts of things." And even if it recognizes the possession of special endowment, it is usually impossible, because of the urgency of routine work, to estimate such endowment correctly or to do anything in particular for it.

There exist, however, yet other injustices of a very different sort, which, unfortunately, often affect the highest grades of supernormal endowment. I refer to the child-prodigy monstrosities. I cannot understand why, to save these prematurely developed gems of human talent, public indignation did not long ago take up arms against the avarice and passion for fame of deluded parents and against the unreasonable attitude of the enthusiastic populace.

The infant prodigies that are exhibited in public represent quite different kinds of endowment. We find the "reading baby," the "child mnemonist" and the "lightning calculator," but the great majority are musical prodigies. Every year sees some new children on the concert platform. Now, these infant prodigies are by no means all of them future geniuses; quite often they represent merely cases of precocious development that later on all the more rapidly reach their limit. They develop rapidly, but they also mature early, and in time disillusion us of the hopes that had been placed upon them. But the dragging of these children before the public, the pampering that they there receive, the one-sided development in them

of striking and sensational performances, together with the lack of quiet and harmonious general development, mean the ruin of their whole lives. How much the more does this truth apply to those rare predestined children who bear within them the germ of real greatness, of creative art, but who are forcibly trained for mere virtuosity, or who, by their childhood life of wandering, suffer injury both in body and in mind!

What has been said thus far has had reference particularly to conspicuous specialized ability. We must now direct our attention to the matter of conspicuous general ability.

That our school system, in its present form, is not, and cannot be, adapted to this type of individual is clear. The school is, of necessity, adjusted for the broad average of ability. This fact determines its method, its pace and the scope of its work. Moreover, our examination system and our scheme of qualifications bring it about that emphasis is laid upon the development in the pupil of a standard of knowledge conforming to the average. The exceptionally intelligent pupil, therefore, receives far less than he can retain and assimilate—less, indeed, than he must receive if his superior abilities are to realize their full promise.

Moreover, a school system adapted to the average is not merely uneconomical for those of unusual capacities. It is, under some circumstances, positively morally dangerous, because, for such pupils, the completion of the assigned work is but play; the slow progress and frequent repetitions bore them; the deeper interests that they bring with them to the school are not enlisted. Consequently, indolence, laxity and dislike for school are readily developed; the spirit of hard work, self-control and conscientiousness that should spring from persistent effort fail to appear; in short, the higher ethical qualities that the school should bring into play are not developed in these pupils—a situation that is doubly deplorable because great mental gifts first make themselves fully evident when they are enlisted in the service of a firm, conscientious will.

In my next article I shall trace the path that must be followed by the special pedagogy of the supernormal that is to come.

*(To be concluded in the April issue.)*



## COMMUNICATIONS AND DISCUSSIONS.

### SIR FRANCIS GALTON.

The death of Sir Francis Galton, which occurred on January 17, within a few weeks of his eighty-ninth birthday, has snapped one of the few remaining links that connect the scientific men of the present generation with the great leaders of nineteenth century thought. Galton, in the course of his long and varied life, had touched on many things and had left his mark on all. He contributed largely to the advance of geography, meteorology, biology, experimental psychology, and anthropology. As far back as 1853 he received the gold medal of the Royal Geographical Society. The Royal Society, which elected him fellow in 1856, gave him its gold medal in 1886, and its Darwin medal in 1902. That was, indeed, a long list of honors which was crowned by the conferment of knighthood in 1909.

The most striking feature of Galton's work is its originality; for all his capacity of sustained and patient labor, he is still pre-eminently the pioneer. His study of the visualising faculty may be said, in James' words, to have made an era in descriptive psychology. He was fertile in devising instruments of precision; his whistle, for determining the highest audible tone, is in every psychological laboratory. His experimental work upon the association of ideas was the starting-point of a long series of investigations, which have led beyond association to the intricacies of thought itself. His exposition and invention of statistical methods opened up a whole new field of psychological enquiry. His formulation of the Ancestral Law—that the characters of the individual are derived one-fourth from each parent, one-sixteenth from each one of the four grandparents, and so on—marked an epoch in the scientific study of heredity. But he will doubtless be best remembered, as he is now best known, by his efforts toward the establishment of the novel science of Eugenics. The interest in race improvement was always with him. His first writings on the subject date back to 1865. In pursuance of exact knowledge, he equipped the anthropometric laboratory which was a leading feature of the International Health Exhibition of 1884, and maintained it for some six years thereafter in the Science Galleries of the South Kensington

Museum. With the same end in view, he has provided the salaries for a research fellow and a research scholar in Eugenics at the University of London. "Its first object," he says of this science, "is to check the birthrate of the unfit, instead of allowing them to come into being, though doomed in large numbers to perish prematurely. The second object is the improvement of the race by furthering the productivity of the fit by early marriages and healthful rearing of their children. Natural selection rests upon excessive production and wholesale destruction; Eugenics on bringing no more individuals into the world than can be properly cared for, and those only of the best stock."

Galton belonged to a disappearing type of workers in science,—men of high native ability and independent fortune, who devote themselves to the advancement of knowledge and its application in the public service from an intrinsic interest and a keen sense of public duty. Charles Darwin, his near kinsman,—Erasmus Darwin was the grandfather of both,—is perhaps the most conspicuous instance of this type, which, indeed, has always found its principal representatives in Great Britain. Specialization, the inevitable result of the vast accumulation of scientific observations, has made such a career well-nigh impossible for the future, at least until such time as great generalizations may have simplified once more our outlook upon the world.

In 1909, Galton published an autobiographical volume entitled *Memories of My Life*. The book, which is written in a clear and straightforward style, and with great modesty of spirit, is of fascinating interest, and may be recommended to those who are as yet unacquainted with its author. It contains three portraits, and a bibliography of books and memoirs nearly two hundred in number. (See this JOURNAL, I: Feb., 1910, p. 107.) The classical *Inquiries into Human Faculty* have been reissued in cheap form as volume 263 of *Everyman's Library*.

#### INDIVIDUAL DIFFERENCES IN THE CORRELATION OF PHYSICAL GROWTH OF ELEMENTARY AND HIGH SCHOOL PUPILS.

The following facts are gleaned from a preliminary report of an investigation in the correlation of yearly and half-yearly increments of growth in height and weight of 350 boys and 435 girls from the University of Chicago Elementary and High Schools, the Francis

W. Parker School and the Horace Mann School of Columbia University. The records include consecutive measurements on the same individuals for periods from 3 to 11½ years, giving a sum total of nearly 6,000 measurements.

In order to determine the relative median heights and weights of the two Chicago schools, and to be able to compare them with groups of children studied by former investigators and with the norms used by Dr. Wood of the Horace Mann School, a median was found at the beginning of the investigation for *all* measurements in the two Chicago schools. This median shows, among other things, that the children in the three schools form practically a homogeneous group.

The individual measurements and appended increments show there are different correlations for growth in height and weight for both boys and girls who are above the median height than for those who are below the median height. Those above begin and end their various periods of acceleration and retardation, on the average, earlier than those below the median. The present results show the average maximum acceleration in absolute height increment for boys above the median to be between 13 and 14 years of age, for those below, between 14 and 15 years of age; for girls above the median, the acceleration is between 11½ and 12½ years of age, and for those below, 12½ and 13½ years of age. This general conclusion is supported by the average results obtained from all half-yearly increments and all yearly increments, based on the year and half-year, and for the schools individually and collectively.

The present results indicate that the same general law is applicable to weight. The maximum increase in absolute weight is earlier for boys and girls who are above the median height than for those below.

Individuals below or above the median height, as a rule, maintain approximately their relative positions throughout the period studied, but they vary in some instances in their deviations from the median and from one another. A few individuals whose measurements lie near the median cross from below to above, or *vice versa*, the smaller number crossing from above to below. A few show no marked changes in relative growth during the adolescent periods.

The fifty-two individual curves for both height and weight (which were shown on accompanying charts) support the general conclusions stated above, and also indicate how one may prophesy the

probable development of a boy or girl after once knowing his or her relative position in reference to the given median. They also demonstrate that the correlations in weight do not follow in detail the correlations in height, since there are more fluctuations in acceleration and retardation, and in several instances an actual loss in weight.

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#### SOUTHERN SOCIETY FOR PHILOSOPHY AND PSYCHOLOGY.

The sixth annual meeting of the Southern Society for Philosophy and Psychology was held at Chattanooga, Tenn., December 27 and 28, 1910. The meetings were presided over by Professor Edward Franklin Buchner, who delivered the presidential address on the topic "Learning and Forgetting."

Among the papers and reports read were the following:

Thomas P. Bailey, New York Bureau of Municipal Research, "Some Supposed Racial Tendencies of the American Negro: A Plea for a Psychological Study of the Race Problem."

Jasper C. Barnes, Maryville College, "The Pressure Curve in Voluntary Control."

Knight Dunlap, Johns Hopkins University, "A Study in Rhythm Perception."

David Spence Hill, Peabody College for Teachers, (a) "Some Needs for Child Welfare in the South;" (b) "Class and Practice Experiments;" (c) "A Comparative Study of Children's Ideals."

A. J. McKelway, Secretary National Child Labor Committee for the Southern States, "Child Labor in Its Relation to Education."

R. M. Ogden, University of Tennessee, (a) "The Order of the Days of the Week and the Pythagorean Philosophy;" (b) "Knowing and Expressing."

Tom A. Williams, Washington, D. C., "Intellectual Precocity: The Role of the Inclinations and Affectivity: A Comparison of the Principles and Methods Employed for Educating John Stuart Mill and Boris Sidis' Son."

The officers elected for the year 1911 are: For president, Dr. Shepherd Ivory Franz, Government Hospital for the Insane; for vice-president, Professor A. Caswell Ellis, University of Texas; for secretary-treasurer, Professor R. M. Ogden, University of Ten-

nessee. Vacancies in the council were filled to constitute that body as follows: For a three-year term, Professors E. F. Buchner, Johns Hopkins University, and W. B. Smith, Tulane University; for a two-year term, Professor Bruce R. Payne, University of Virginia, and President H. J. Pearce, Brenau College; for a one-year term, Professors David Spence Hill, Peabody College for Teachers, and W. C. Reudiger, George Washington University.

It was voted to hold the next meeting of the society at Washington, D. C., in affiliation with the American Association for the Advancement of Science, provided the American Psychological and Philosophical Associations meet at the same place and time.

R. M. OGDEN, *Secretary*.

### AN INVESTIGATION OF THE SLEEP OF NORMAL SCHOOL STUDENTS.

Sleep is so vitally related to the mental and physical health and efficiency of human beings that I decided to investigate the sleep of my own pupils. In order that interest might be aroused in the investigation, all students received some instruction in the physiology and hygiene of sleep. Then a typewritten questionnaire was put into the hands of each student and every question was carefully discussed and explained. Each pupil also received a number of recording sheets which had been arranged so that daily records might be easily kept. In giving instruction as to the keeping of the records, the following specific recommendations were emphasized:

- (1) Record your observations in the morning as soon as convenient.
- (2) Make no record if in doubt.
- (3) If it is impossible to record the facts in the morning, make no record for that day.

To secure investigators who would be interested, and therefore presumably more accurate, volunteers were called for. Forty-nine in all responded, 23 from the senior class (third year) and 26 from the junior class (first year).

That the influences of school work and weather might be equalized, the records were to extend from February 15, 1910, to March 15, 1910, or 29 days in all.

The conclusions of this investigation were based upon the answers to the following questions of the questionnaire sheet:

- (1) At what time do you retire? At what time do you rise?
- (2) Was your sleep continuous or was it slightly broken or much broken by wakefulness?
- (3) Did you dream? Were your dreams a reflection of the school work of the previous day?
- (4) Was the window of your sleeping room open?

The seniors submitted 602 daily records and the juniors 699, making a total of 1301 daily records. The lowest number of records made by any one pupil was 14 and the highest 29. Thirty-nine of the students submitted from 26 to 29 daily records.

The answers to the first question show that practically all the students had established the habit of arising at a fairly definite time. An exception was noted in each class. Eight juniors and seven seniors, or approximately 38 per cent. of the students, had not cultivated the habit of retiring at a specific time.

The following table indicates the average number of hours and minutes of sleep (or opportunity for sleep) taken daily by each student:

Juniors.			Seniors.		
Students.	Av. hrs. and mins.		Students.	Av. hrs. and mins.	
4	8		1	7	35
1	8	15	5	8	
1	8	30	4	8	15
5	8	45	3	8	30
6	9		2	8	45
3	9	15	4	9	
6	9	30	2	9	15
			1	9	30
			1	9	45
<hr/>			<hr/>		
Total 26	Class av. 8	53	Total 23	Class av. 8	34

The figures show that the juniors take on the average 8 hours and 53 minutes for sleep daily and the seniors 8 hours and 34 minutes. The juniors get on the average 19 minutes more for sleep every night than the seniors. The table shows that no junior gets less than 8 hours for sleep daily, and that there are only four who get so small an amount. Twenty of the juniors get on the average between 8 hours and 45 minutes and 9 hours and 30 minutes. Only one senior gets less than 8 hours for sleep.

Physiologists are agreed that more sleep is required during periods of greatest growth and that less sleep is needed with the advance-

ment of age. The application of this law is shown in this investigation. The juniors are on the average between 18 and 19 years of age, and the seniors between 20 and 21. According to the estimates of Dr. Dukes, pupils between the ages of 17 and 19 should get  $8\frac{1}{2}$  hours of sleep per night. If we accept his opinion as being reliable and consider the month as typical, we must conclude that a large majority of the students who took part in this investigation are getting sufficient sleep. Even the seniors who have passed the age of 19 are getting an average of 8 hours and 34 minutes for sleep per night. Only five students of the junior class were getting less than the estimated amount of time for sleep, and this loss did not exceed 30 minutes.

The answers to the second question show that there is a remarkable similarity between the two classes as to the continuity of sleep. The juniors had continuous sleep 80 per cent. of the nights. Five per cent. of them was much broken by wakefulness and 15 per cent. was slightly broken. In the case of the seniors, 82.74 per cent. of the sleep was continuous, 3.48 per cent. was much broken by wakefulness and 13.78 per cent. was slightly broken. In other words, the pupils slept approximately four nights out of five without an interruption. One student of the junior class and four students of the senior class had continuous sleep during the entire time observed. The poorest sleeper was in the junior class. During the month she had 8 nights of continuous sleep, 6 nights of much broken sleep, and 15 nights of slightly broken sleep. The physical examiner reports her physical condition as normal. The above figures should not be considered as entirely correct. Every person has interruptions in his sleep that he forgets before morning arrives. The above report is a record of the memory of interruptions. It is fair to assume that a serious interruption of sleep would be remembered. If we assume that the nights of sleep interrupted by much wakefulness were unsatisfactory for sleep, then the juniors did not sleep well 5 per cent. of the nights, and the seniors 3.48 per cent. of the nights. Averaging the percentages, we may conclude that 4.24 per cent. of the nights of sleep was unsatisfactory. If we consider the ordinary month as having 30 days, these students may be regarded as having on the average one night of unsatisfactory sleep during a month—an admirable record.

The responses made to the third question indicate that the pupils remembered that 43.63 per cent. of the number of nights of sleep

was characterized by dreams and that 28.38 per cent. of these dreams were recognized as being reflections of the school work of the previous day. Our psychology of dreams is so uncertain at present that the writer refuses to draw any conclusions from the above figures.

The records show that only two students had the habit of sleeping with the windows of the sleeping room closed.

The principal value of this investigation was the arousal of enthusiasm in students for the study of psychology and hygiene and for the practice of the laws of health. Many pupils have told the writer since this investigation that they were getting more sleep. Similar information should be of value to every administrator of schools because it often throws light on the mental and physical condition of pupils. Sleep is the great prophylactic and is comparable in its influence to fresh air, pure water, nutritious food and healthful exercise.

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## ABSTRACTS AND REVIEWS.

G. V. HAMILTON, M.D. *A Study of Trial and Error Reactions in Mammals.* The Journal of Animal Behavior, 1: No. 1, January, 1911. Pp. 33-66.

This interesting study in comparative behavior marks a distinct advance in the investigations of the evidence of mind in animals. The earlier studies of animal behavior dealt chiefly with sensory discrimination. More recently attention has been directed to the learning process in habit formation. The present article discusses a still higher phase of mental activity,—the elements of inference, or practical reasoning. Moreover, Dr. Hamilton's study is of particular interest to educators in that it is comparative in the larger sense, including human subjects, both adults and children, as well as animals.

The subjects comprised two adults, seven boys between eight and fifteen years, one girl ten years old, one boy twenty-six months old, five monkeys, sixteen dogs, five cats and one horse. A large, fan-shaped cage was constructed, with an entrance door at the center or handle, and four exit doors at the outer edge of the fan, symmetrically arranged with respect to the entrance. Each exit could be locked or unlocked by the experimenter without the knowledge of the subject. The animals were previously trained to get out of the cage by pushing open one of the exit doors, all of which were at first left unlocked. They were rewarded by receiving food.

In the test series the subject was placed in the cage by means of the entrance door, all the exits but one were locked, and the efforts of the subject to escape were recorded. One hundred trials were made with each subject, and the unlocked door was changed with each trial in such a manner that it was impossible for the subject to foresee which door would be open. There was but one constant factor: *The same door was never open at any two successive trials.* A door that had brought freedom at one trial was certain never to do so at the next. One aim of the experiment, therefore, was to determine whether the subject's behavior indicated the ability to draw this inference.

The total number of efforts for the one hundred trials varied from 183 (girl) to 461 (horse). Each of the human subjects made

less than 237 efforts, with the exception of the twenty-six months' old boy, whose score was 315. The monkeys varied from 272 to 291, the dogs from 284 to 438, and the cats from 320 to 406.

The author's analysis of the types of reaction is of interest. Unfortunately all reactions which led to the discovery of the unlocked door before all three possible doors were tried, and which did not include more than a single effort during the trial to open any given door, were rejected from the tables as "unclassified" reactions. Yet inspection of the tables shows that 50 per cent. of the reactions in the case of the horse, and from 60 per cent. to 80 per cent. in the human subjects, were of that character. A study of these reactions might have thrown much light upon the mental processes involved in the choice of door. Of the "classified" reactions the author distinguishes five types. In Type A all three possible doors were tried once each, while no effort was made to open the impossible door. From 70 per cent. to 85 per cent. of the normal human reactions were of this type. In Type B all four exits were tried once each, in irregular order. One monkey, one dog, one cat and a defective man showed a preponderance of such reactions. Type C occurred only when the unlocked door was at the extreme right or extreme left, and involved trying each of the four exit doors once in regular order. One monkey and two dogs showed reactions predominantly of this type. Type D involved more than a single effort to open the same locked door during a trial, but between separate efforts some other door was attempted. This repetition of useless efforts characterized the predominant reactions of three monkeys and one dog, and most of the other animals showed high percentages of this sort of reaction. Type E included various highly inappropriate modes of attempting to escape, such as repeatedly trying the same locked door, repeatedly attacking a group of locked doors in regular order, and persistently avoiding the unlocked door for seven or more efforts. This was the predominant type for the twenty-six months' old boy, thirteen dogs, four cats and the horse. None of the animal subjects seemed to have a consistent awareness of the impossible door as such. It is to be regretted that the author gives no chronological presentation of the reactions of the individual subjects. Such a tabulation would reveal the development of the recognition by the human subjects of the impossible door, and would throw an interesting light on the genesis of inference.

As a preliminary survey of a most important field of investigation

this study deserves the highest commendation, and the article should be read and pondered by psychologists, educators, and all who are interested in the development of the higher thought processes.

J. C. B.

HENRY C. MCCOOK. *Ant Communities and How They are Governed. A Study in Natural Civics.* New York and London: Harper and Brothers. 1909. Pp. xvii, 321, \$2.00 net.

Following the plan pursued in his earlier publication, *Nature's Craftsmen*, the author's purpose in the present volume is to give a natural history of ants in popular form. In this latter work, however, he considers only the behavior of ants, and mainly as social animals, with the secondary aim of pointing out parallels between communal actions of ants and of man. Among the topics considered in the sixteen chapters of the book are fraternal confederacies and communal righteousness, nesting architecture, engineering methods, supplying the communal rations, the language of ants, female government, the problem of communal dependents, warrior ants, alien associates, the founding of slave-making communes, problems of sanitation and personal benevolence. The underlying idea is that social life, wherever it exists, has many necessities and aims, and therefore many resemblance in methods of accomplishing social results. These matters are of a fundamental nature, and a moral frequently drawn is that man may find some things to imitate in the social life of ant communes. The book carries out admirably the purpose set. It recounts the facts of ant behavior that are of popular interest in a clear and vigorous style, and makes many interesting comparisons with human activities that would not suggest themselves at once to the student with only a scientific interest in the subject. Unlike many popular books on animal behavior, it does not inseparably mix anthropomorphic interpretations with observed facts. The account given is therefore of considerable scientific value as well as of popular interest. The observations made cover aspects of ant behavior that have been mostly neglected by studies with a purely scientific aim, and are a valuable supplement to the latter. For these observations the book itself must be consulted. The author is as a rule cautious in his interpretations and rejects many anthropomorphisms that the popular mind would readily seize upon. He does not attribute rational processes to bits of behavior, which, when taken alone, might suggest it. On the other hand, he does not hesitate to attribute various other mental processes to ants, including even the analogues of the more complex human emotions and instinctive

*knowledge.* Speaking of the behavior of ants that had been dipped in various odorous solutions and when attacked by their nest-mates, he thinks that the conclusion is justified that the former "tacitly recognized the fact that they had become obnoxious to the communal police," that "their instinctive sense of obligation to submit to the 'legal authority' was so imperative that they yielded themselves to their fate . . . ." This "sense of obligation" he regards as a something that takes the place of human conscience, while not, in this case, conceding that it may be even its remote analogue. A few other instances might be cited of a similar nature, but the most that could be said in criticism is that it is not always entirely clear as to whether the author is indulging merely in the license of a popular style or is attempting to give a scientific interpretation of the observed facts of behavior.

University of Illinois.

F. KUHLMANN.

GEORGES BOHN. *La Naissance de l'Intelligence.* (Paris: Ernest Flammarion, 1909. Pp. 350.)

The first part of the book is introductory and critical. In the second part, variability in reactions, due to the association of previous experiences, is accepted as the criterion of consciousness. The tropism concept is defined and thoroughly discussed in the third part. Part Four emphasizes the rôle played by the developing sense of sight in the formation of associations and habits. Vision is necessary in the elaboration of the higher mental processes. In the fifth and closing part of the volume the progress of intelligence is described as having taken place according to three great stages. The first is the appearance of the organ of sight, with the consequent glimmering of intelligence; the second is the development of the central nervous system, and the third is marked by the appearance of man upon the earth. Human intelligence is separated from that of the animal by an unspanned chasm, which the author suggests is likely to become greater still, as the human brain may not yet have reached its climax of development.

M. J. LAURÉ.

University of Iowa.

J. SOGARD. *Public School Relationships.* (With an introduction by H. H. Seerley.) New York: Hinds, Noble and Eldredge, 1909. Pp. xxiv, 197. \$1.00.

This little book attempts the important task of defining the relationships which exist between the component parts of the public-school sys-

tem—between the community and the school officers, the school authorities and the teacher, the teacher and the pupil. The data have been drawn largely from questionnaires sent to school officers and teachers; as a result of this method, the book reflects—more adequately, the reviewer believes, than any work hitherto published—the conception of school relationships held to-day by successful practitioners in public-school work. The author's interpretations of the results are, in general, sane and thoroughly helpful to the young teacher, and particularly to the young principal or superintendent seeking orientation in a new and complex field. Certainly a publishing house that fails to provide an index for a book of this type deserves censure. A list of the "several hundred" schoolmen who furnish the data would add the book's value as representing a consensus of expert opinion. One's psychological conscience is irritated by the statement, "Telepathy plays an important role in the art of teaching" (p. 113), but relief comes when one finds that the author really means "suggestion."

W. C. B.

J. M. GILLETTE. *Vocational Education*. (New York: American Book Co., 1909. Pp. viii, 303. \$1.)

Professor Gillette endeavors in this book to outline the criteria necessary to enable superintendents and teachers to reconstruct the school curriculum and courses of studies along lines that will result in greater economic efficiency and better social adjustment.

The author believes that to socialize education completely would be to vocationalize it. To vocationalize it would be so to reconstruct it, and so to readjust it that it would harmonize with the exact constitution of society. One to be vocationalized should "be essentially cultured and fundamentally moralized." "To be essentially cultured is for him to have information about himself, nature and society which is most mediate to his wants and safety. . . . To be fundamentally moralized is to have instilled habits, reactions and outlook of good citizenship. Good citizenship consists in viewing conduct as related to social welfare and as measured by it." "Thus vocational education is a practical and direct conception of making young human beings fit for life."

The author enters into the analysis of social and economic conditions, causes of crime and pauperism, and experiments in vocational training as a means of alleviating pathological conditions. Two-thirds of the book is devoted to the establishment of the justification

for his criteria, which are developed in Part Three—"Methods of Socialization."

In the development of these criteria the author is concerned with principles rather than the application of principles to details, because different localities have different vocational interests. He believes that, with general principles once established, educators could readily work out their application in accordance with the needs of their own localities. The author's point of view is strictly vocational and utilitarian, and his discussions of moral and cultural training are in accordance with this view.

The author's conception of vocational education is broad, but after one has read the book one lays it aside with a feeling that it is superficially treated. The author fails to convince one that to socialize education completely would be to vocationalize it, and one might question whether crime and pauperism are due so much to the lack of specific vocational training as the author believes. There are important factors entering into the production of pauperism and crime aside from lack of specific vocational training which should be controlled largely through education, either directly or indirectly. The biological factors that enter into such a problem, the development of the controls of conduct and the motivation of education should have received more attention in a book so wide in its scope. In Part Three, "Methods of Socialization," the author has done his best work. The criteria for the moral and religious education and for the reorganization of the curriculum are very good.

The author is to be commended for his effort. The book is a timely contribution, and should do much good in arousing thought on this vital subject.

W. M. RUTHRAUFF.

Chicago, Ill.

GEORGE E. DAWSON. *The Child and His Religion*. (Chicago: University of Chicago Press, 1908. Pp. 120. \$0.82.)

G. L. RAYMOND. *The Psychology of Inspiration*. (New York: Funk & Wagnalls Company, 1908. Pp. 340.)

C. L. DRAWBRIDGE. *Religious Education—How to Improve It*. (London and New York: Longmans, Green & Co., 1907. Pp. 222.)

W. BOUSSET. *What Is Religion?* (New York and London: G. P. Putnam's Sons, 1907. Pp. 299. \$1.50.)

Dawson's book is built around the chapter on the child's interest in the Bible. Children up to eight or nine years of age are more

interested in the accounts of the birth and childhood of Jesus than in any other elements of the Bible. The typical boy or girl from 9 to 14 years of age is more attracted to the Old than the New Testament. During adolescence the center of interest shifts to the Gospels. The three most popular Bible scenes are Daniel in the Lion's Den, the Crucifixion and the Birth of Jesus, in the order given. The selling of Joseph, David and Goliath, Daniel and the Assyrian Kings are the three Bible stories of greatest interest. During the early adolescent period John the Disciple, Peter and Jesus are the first three biblical characters chosen. The interest in Jesus culminates somewhat later, and is sustained throughout. It follows that the Bible should be given to the child through these personal elements that loom up so large in his interest.

Raymond attempts to harmonize religious values with the accepted results of scientific research. Holding the theory of a suggestive rather than a dogmatic inspiration, the author accounts for the inaccuracies of the biblical text and for the various interpretations of the same statements of Scripture. Thus the right of private interpretation is carried out to its logical conclusions. The book is written from such a viewpoint that too little credit is given to others who have done excellent work along similar lines.

Drawbridge presents a plea for religious culture, based upon the principles underlying the natural development of the child, as a preparation for confirmation. It is doubtful if the author has made any contribution to the subject of religious education aside from his fresh emphasis of the vital questions involved.

From a study in comparative religions, Bousset concludes that the teaching of Jesus is superior to all others because of its revelation of the Father who forgives sin. But out of the simple Gospel there were evolved by Paul the belief in the deity of Jesus, the doctrine of the atonement through the death of Christ, the teaching that grace is imparted through the outward sacramental acts. In order to reach the height of its development Christianity must free the Gospel of Jesus from these Pauline additions, together with the belief in miracles, as infractions on natural laws and the doctrine of a special revelation.

K. R. STOLZ.

University of Iowa.

## NOTES AND NEWS.

THE SUPERNORMAL CHILD. We desire to call the special attention of our readers to the articles from the pen of Professor Stern, the translation of which we print in this and the following issue. When we apply his arguments to American conditions, several considerations come to mind. In the first place, the average level of school performance in Germany is unquestionably several grades higher than the average level in this country. If, then, it is worth while in the German school system to "rescue" supernormal children from the deadening effects of classroom association with mediocrity, then *a fortiori*, such a segregation is a crying need of American schools.

But we do not expect that any one will seriously dispute his main thesis—that we need a pedagogy of the supernormal child. The psychology and pedagogy of the subnormal child is just now in a flourishing condition in the United States. No one, however, so far as we know, has outlined a *systematic* campaign for the supernormal child. Not that no heed has been paid here to the treatment of exceptionally able children. The records of the Bureau of Education show, on the contrary, that there are at least 69 cities of over 30,000 population (and to these should be added a few cities of smaller population) that have special classes for gifted children. We hope at some later date to summarize more carefully the various plans adopted in these school systems. A hasty survey of them, however, leads us to conclude that there is little uniformity of administrative procedure and that there is practically no scientific information as to the best methods of selecting gifted children, of differentiating the merely clever or the exceptional memorizers from the truly able, no information as to the rigor of selection that is needed, the age at which entrance to special classes should be arranged, the special nature of the class work that is demanded, or as to the desirability of separating out children whose supernormality is specific rather than general; that, in short, we are just now only feeling our way in a field of educational effort that should at once be scientifically surveyed.



So far as our psychological knowledge of supernormality is concerned, it would appear to us that the plans for the examination of individual children that Dr. Wallin has so vigorously set forth in his appeal for the establishment of psycho-educational clinics in universities and school systems—that these plans might be directed quite as much to the study of supernormal as to the study of subnormal children, and with perhaps a greater ultimate benefit, both to the individuals concerned and to society at large.

Finally, the question may be raised: What, after all, is the advantage of saving one or perhaps two or more years in the bright pupil's school schedule? Ought we not, logically, to accompany our special pedagogy of the supernormal by a special philanthropy of the supernormal? We clothe, feed, and institutionalize the subnormal. Why not at least subsidize the supernormal? We can think of no single movement that is more worthy of attention or that promises richer results, whether for educational psychology, for our school system or for society, and of none that should make a stronger appeal to philanthropists.

G. M. W.

No one is more interested in behavior than the teacher. His whole task is to influence and develop behavior along certain lines, in accordance with definite social demands. For no one, therefore, do careful and accurate studies of behavior have a greater significance than for him. That progressive teachers are coming to have a keen realization of this fact is evidenced by the rapid growth of the child-study movement in the past twenty years, by the present wide-spread interest in experimental pedagogy, and by the extent to which the foremost writers on education are making use of studies in animal behavior. The recent important works on the principles of education by Bolton and Henderson are written throughout from the biological point of view, and contain frequent references to the investigations of Jennings, Thorndike, Hobhouse, Yerkes and other students of animal reactions. It is becoming more and more generally recognized that the behavior of the child can best be understood by comparison with the behavior of animals.

We are convinced, therefore, that educators will cordially welcome the new *Journal of Animal Behavior*, published by Henry Holt & Co., New York, and edited by a distinguished corps of students of animal behavior, under the management of Professor Robert M. Yerkes, of Harvard University. Heretofore the contributions to

animal behavior have been scattered in biological, neurological, and psychological periodicals, and have been available only to those who have access to large departmental libraries. It will thus be a great convenience to have a journal which is devoted solely to the publication of these researches. The first number, whose contents are noted in our "Current Periodicals" section, presents several studies of learning in animals which are of great interest and importance for the understanding of the learning process. Particularly valuable is the comparative study of reactions by Hamilton, a contribution full of significance in its educational bearings. The journal is issued bimonthly, and the subscription price is \$3.00 per year. We heartily commend the publication to the careful perusal of our readers.

J. C. B.

The eighth annual report of the Chicago Parental School contains a description of the mental and physical tests used by Dr. Frank G. Bruner of the Chicago Child Study Department in the examination of boys entering the school. In addition to the usual physical measurements of weight, height, head, chest, arms and legs, tests are made of lung capacity, strength of back and legs, grip of hands, rate and accuracy of movement, and acuity of vision and hearing. Several mental tests are described under each of the following topics: Perception, visual imagery, memory, association and learning.

In the January number of *The Training School* Dr. H. H. Goddard makes a preliminary report on the application of the Binet tests to over 1500 normal children in Grades I-V. Of these children, 554 were found by the tests to be "at age." Of those testing "above age," 329 showed one year, 49 two years, 14 three years, and 2 four years of advancement. Those testing "below age" were distributed as follows: 312 showed one year, 156 two years, 79 three years, 37 four years, 8 five years, 6 six years, and 1 seven years of retardation. Dr. Goddard reaffirms his confidence in the reliability of the tests, and calls attention to the fact that over four per cent. of these children are more than one year ahead of their age. "These constitute the children who are born with exceptional endowments and who enter school and go on through school with greater ability than the average. Are we doing in our public schools all that might be done to conserve the advantage which these children naturally have, or are we, on the contrary, simply turning them in with the average

child and really compelling them to mark time or to be idle while their less fortunate brothers and sisters are catching up?" On the other hand fifteen per cent. are two and three years behind their age, and constitute the laggards or backward children, while three per cent. are from four to seven years below age, and are undoubtedly feeble-minded. It would be a great economy in school administration to segregate these and give them special instruction.

The New York Branch of the American Psychological Association met at Columbia University, February 3 and 4. There was a large attendance of psychologists from all parts of the country, and the program was one of special interest. Among the papers presented was one by Professor Norsworthy on the relation of quickness of learning to retentiveness, which will appear later in this JOURNAL. Professor Thorndike discussed theories of fatigue, Dr. Radosavljevič reported on his studies of cephalic indices in relation to intelligence, Professor Macdougall spoke on the system of habits and the system of ideas, Dr. Hollingsworth emphasized the vicarious functioning of irrelevant imagery, and Professor Woodworth presented a note on the psychology of relations, and gave some interpretations of imageless thought. At the final session Dr. Wallin outlined his plan for the experimental and observational study of the efficiencies of epileptics, in which the Binet tests are supplemented by tests of memory, association, perception and attention, imagination and capacity for learning, by a personal, social and industrial efficiency report, and by a report on efficiency in school subjects. For each of these Dr. Wallin has worked out elaborate blank forms, which were distributed at the meeting. The whole constitutes perhaps the most exhaustive system of diagnostic tests yet proposed. Professor Will S. Monroe reported on the application of the Binet tests to 300 children between four and six years of age. Many of the tests were found to be somewhat too difficult for the age indicated, so that the percentages were slightly lower than those given by Binet. Following the dinner on Friday evening a special session was held in memory of William James, at which Professors Miller, Angell, Thorndike, Calkins, Jastrow, Dewey and others gave their personal reminiscences of the lamented psychologist.

On February 17 the Texas Academy of Science held a memorial meeting in honor of William James. Papers were presented by Professor Bird T. Baldwin on "His Life and Educational Influence," and by Dr. C. S. Yoakum on "His Philosophy."

The fifth congress of the American School Hygiene Association was held in New York city, February 2-4. In his opening address the president, Dr. Luther H. Gulick, of the Russell Sage Foundation, emphasized the need of measuring results in education. The address will be published in full in this JOURNAL. Among other topics of discussion may be mentioned "Medical Inspection of Schools," "The School Nurse," "Examination of the Eyes of School Children," "Standardization of School Books," "School Instruction in Sex Hygiene," "The Feeble-Minded Child," and "Studies in Fatigue."

The New York Child Welfare Exhibit, January 18 to February 12, was an attempt on a large scale to make the people realize what is being done by various organizations and agencies for the betterment of the condition of children. Around the interior of the large armory in which the exhibit was held were erected booths in which were displayed by means of pictures, diagrams, charts, and transparencies the needs of the children, and the ways in which these needs might be satisfied. Among the salient features of the display were foods and feeding, clothing, housing of the child, home life, recreations and amusements, child labor, health, libraries and museums, schools, social settlements, religious influences, associations and clubs, and children's courts. Conferences were held every afternoon and evening, and many of the most eminent men in the country in their respective lines participated as speakers. The following are a few of the topics considered: School self-government, the wider use of the school plant, compulsory education, the exceptionally bright child, the subnormal child, open-air schools, vocational education, dance halls, moving picture shows, children's clubs, the Boy Scout movement, child labor versus child welfare, sex hygiene and the child, children's courts, the Big Brother movement, juvenile probation, and reformatory institutions. An active and well-organized advertising campaign was carried on throughout the city, with the result that hundreds of thousands of people visited the exhibit, and at times the crowds were almost unendurable. Instance after instance has been brought to the attention of the management where, as a result of the exhibit, individuals have been stirred up to correct abuses in their neighborhood, or have shown their appreciation of agencies to which they were previously indifferent.

According to the report of Dr. Newman, Chief Medical Officer of the Board of Education (England) for 1909, "great things have been accomplished in the three years since the passing of the act initiating statutory medical inspection" of the public elementary schools. But the *Educational Times* (London) thinks it is obvious that "only a beginning has been made in the work of amelioration. For many reasons it is not yet possible to furnish accurate comparative statistics of the prevalence of school diseases in the country as a whole," but, to quote again from the report, "it may be stated generally that in respect to the six millions in the public elementary schools of England and Wales, about 10 per cent. of them suffer from serious defect in vision, from 3 to 5 per cent. suffer from defective hearing, 1 to 3 per cent. have suppurating ears, 8 per cent. have adenoids, or enlarged tonsils, of sufficient degree to obstruct the nose or throat, and to require surgical treatment, 20 to 40 per cent. suffer from extensive and injurious decay of the teeth, 40 per cent. have unclean heads, about 1 per cent. suffer from ringworm, 1 per cent. are affected with tuberculosis of readily recognizable form, and  $\frac{1}{2}$  to 2 per cent. are afflicted with heart disease." We have no means of knowing just where the line between defect and normality has been drawn by Dr. Newman, but these figures, as they stand, show smaller percentages of defectiveness than have been commonly reported from the inspection of American school children.

The Public Health Education Committee of the New York Medical Society has arranged for a series of weekly public lectures from January 12 to March 29 on the general subject of the prevention of disease. The special topics include home hygiene, industrial hygiene, cause and prevention of some common diseases, insect-borne and water-borne diseases, pure milk and infant hygiene, public health of the school child, congenital and acquired deformities, mental hygiene, alcohol and meat in relation to diseases, the health of women in youth and maturity, and the care of the eyes.

In his recent address to the principals of New York city, Superintendent Maxwell emphasized the two points of promotion and the development of good intellectual habits. His recommendations regarding the organization of special classes for bright pupils are in harmony with the considerations advanced by Professor Stern in the present issue of this JOURNAL, and his injunctions as to the

cultivation of general habits raise interesting questions of practical importance in connection with the general effects of specific training. The address will receive more detailed consideration in a subsequent issue.

From January 31 to February 9 a course of daily public lectures was given at Columbia University by eminent visiting psychologists on the general subject of "Problems in Psychology." The speakers were as follows: C. E. Seashore, "The Training of the Voice in Singing;" Charles H. Judd, "Social Psychology;" E. B. Titchener, "Memory and Imagination;" J. R. Angell, "Frailties of Imageless Thought;" Mary Whiton Calkins, "The Standpoint and Scope of Social Psychology;" Joseph Jastrow, "The Psychology of Dream States;" W. B. Pillsbury, "The Rôle of the Type in Mental Processes;" George T. Ladd, "The Ontological Problem of Psychology," and Josiah Royce, "Some Psychological Topics Emphasized by Pragmatism."

From the beginning of the year 1911 *Zeitschrift für Experimentelle Pädagogik* and *Zeitschrift für Pädagogische Psychologie* will be combined into one. The new magazine will be published through the firm of Quelle & Meyer, Leipzig, under the title *Zeitschrift für Pädagogische Psychologie und Experimentelle Pädagogik*. The editors, Meumann and Scheibner, assisted by Gaudig and Fischer, aim to have the new magazine include the major fields heretofore covered by the two journals. The new *Zeitschrift* will appear monthly, and the subscription price will be 10 marks per year.

The next International Congress of Psychology will be held in this country at Easter, 1913. The first three days of the session will be held at Columbia University and the other three days at Harvard University. A committee composed of the past presidents of the American Psychological Association met in New York recently and perfected the plan of organization. There is a standing international committee and a smaller committee appointed by the American Psychological Association, which will co-operate with this larger committee. It was decided that the vacancy in the presidency caused by the death of the late Professor James should not be filled, but that the meeting should be considered in a sense a memorial to this great psychologist. Professor John Watson of Johns Hopkins University is secretary of the congress.

The Association of Teachers of Mathematics in the Middle States and Maryland has appointed three committees, one each on arithmetic, algebra and geometry, to investigate the objects and aims of teaching these subjects and to determine by experiment the best means of attaining the desired ends.

Harvard University has adopted a new plan for admission, which is a compromise between the certificate and the examination methods. The candidate must (1) present a tabulated statement attesting the completion of an approved secondary school course. This statement must show the subjects studied by him, the time devoted to each subject, and the quality of his work. An approved secondary school course must extend over four years, must concern itself chiefly with languages, science, mathematics and history, and at least two of the subjects must be carried to the stage required by the present advanced examinations of Harvard College. The candidate must, further, (2) offer himself for examination in the four following subjects: (a) English, (b) Latin (French or German), (c) Mathematics or Science, (d) any subject from the following list (not already selected): Greek, French, German, History, Mathematics, Chemistry, Physics. The examination papers will include a considerable number of alternative questions, and some of the questions will be of an advanced nature, thus enabling the candidate to show the extent of his preparation. It is hoped that the scheme will improve the articulation of the college with secondary schools, particularly public high schools.

The academic department of Yale University has under consideration a plan for admission which will allow certification in place of examination for a part of the entrance requirements.

The State of Vermont has increased its appropriation for Middlebury College by \$7,600. A part of this increase will be used to provide additional instruction in pedagogy.

Teachers College, Columbia University, is offering a course on the care of infants and small children. Such a course is of general interest at this time, when the attention of the public is being drawn to child welfare matters. Instruction in this subject is now given to girls and young women in the public schools of New York and Philadelphia, in many high schools throughout the country, and in several women's colleges.

Sir Francis Galton, the celebrated founder of the Eugenics Laboratory, died January 17 at the age of 88 years. In another column we publish an appreciation of his life and work.

Dr. Irving King, assistant professor of education at the University of Iowa, will give courses in social education and principles of education at the summer session of the University of Wisconsin.

Professor E. B. Titchener of Cornell University gave a series of lectures on psychological subjects at the University of Iowa, February 20, 21 and 22. While in the West he also lectured at the University of Kansas and the University of Indiana.

The Houghton Mifflin Company announces a series of Riverside Readers, under the editorship of Superintendent James H. Van Sickle, Miss Wilhelmina Seegmiller, and Miss Frances Jenkins. The series will contain selections from standard American authors whose works are published by that house, and will be illustrated by some of the best known American artists.



## CURRENT PERIODICALS.

(In this section only such articles will be noticed as bear directly or indirectly upon the interests of this Journal.)

THE JOURNAL OF ANIMAL BEHAVIOR. Vol. I, No. 1, January, 1911. D. B. CASTEEL. *The Discriminative Ability of the Painted Turtle*. 1-28. Turtles learned to discriminate between black and white surfaces, between series of vertical and horizontal lines, and between two series of parallel horizontal lines of different width. Their learning was slow, requiring an average of 183 trials to establish discrimination. Memory tests showed a fair degree of retentiveness. The turtles showed marked individual differences in disposition and mental ability, and the high degree of discrimination exhibited with parallel lines leads the author to conclude that such discrimination may play an important part in the activities of their daily life. S. J. HOLMES. *The Reaction of Mosquitoes to Light in Different Periods of Their Life History*. 29-32. Mosquito larvae of all ages react quickly to shadows by swimming downward from the surface of the water where they are resting. Whether the light comes from above, from the side, or from below, the sudden interposition of an object casting a shadow suffices to produce the response. There is no response to the object itself. Repeated exposure to shadows at intervals of one minute brings about such an adaptation that the response soon fails to take place. Even after the first trial there is a decided decrease in the number of animals responding, and after seven to twelve trials none of the larvae responds. Both the larvae and the adult mosquitoes show more or less general positive phototaxis. G. V. HAMILTON. *A Study of Trial and Error Reactions in Mammals*. 33-66. (Reviewed on page 157 of this issue.) LUCY M. DAY AND MADISON BENTLEY. *A Note on Learning in Paramecium*. 67-73. Paramecium is capable of modifying within a few minutes its usual avoiding reaction. The effect of this modification remains for some time independently of external changes induced. Observations of this nature are taken as evidence of learning, and this interpretation is further supported by the fact that during the process of turning, the animal had the appearance of doing a definite thing. Nevertheless it is questionable whether this kind of "learning" involves consciousness; whether it is not as well interpreted as the result of organic processes.

RIVISTA PEDAGOGICA. Year IV. Vol. 2, No. 1, January, 1911. GIOVANNI VIDARI. *Nationalism and the Schools*. 1-11. A plea for the co-operation of the schools in developing for Italy a civic and moral unity which shall supplement and reinforce the political unity gained a generation ago. The loss through emigration of the best blood and brawn of the nation is particularly deplored. Those good Americans who are so troubled over Italian immigration to this country that they would fain restrict it, might have their fears somewhat allayed if they could read this statement of the case from the other side. TULLIO TENTORI. *Intellectual Overcrowding and the Course of Study*. 26-33. The author laments the overcrowding of the curriculum in Italian secondary schools, and attributes it to (1) the ideal of encyclopedic culture which is traditional, (2) the excessive number of teachers, which tends to split up the work of the class, and (3) the tendency of pupils to specialize in the name of science. Such specialization in secondary schools does not produce scientists, but mere plodding pedants, devoid of the larger view and the fuller comprehension of what science signifies. C. TOMMASO ARAGONA. *Instruction, Education and the Course of Study*. 50-58. A discussion of the fundamental principles of education, based largely upon Herbart. C. BERTANI. *The Preparation of Teachers and Their Scarcity*. 59-61. The lack of elementary teachers in Italy is serious, yet there is a general feeling that the preparatory course of study for teachers should be prolonged. The author contends, on the contrary, that the work in the elementary schools should be prolonged and broadened, and that the course of the normal schools should be pruned of much of its superfluous dead wood. GUIDO DELLA VALLE. "*Children's Homes*" and "*Scientific Pedagogy*." 67-80. A trenchant criticism of pseudo-scientific pedagogy as exemplified in a recent Italian publication. The author demands that before attempting to write about scientific pedagogy, one should at least know the names of such workers as Meumann, Binet, Hall, Thorndike and Spearman.

PEDAGOGICAL SEMINARY. Vol. 17, March, 1910. LEO BURGERSTEIN. *Co-education and Hygiene, with Special Reference to European Experience and Views*. 1-15. Psychologically there are hardly any serious reasons against co-education in high schools, but physiologically the available evidence speaks against loading girls with such burdens as boys now carry in European high schools. BURGERSTEIN. *The Main Problems of Schoolroom Sanitation and School Work*. 16-28. An interesting and expert discussion of the problems of illumination, ventilation, warming, school-desks, writing and reading. BURGERSTEIN. *Some Remarks on the Relations of Body and Mind*. 29-39. A summary of the facts revealed by the most important experimental investigations of the factors, particularly fatigue, that condition mental efficiency. THOMAS A. STOREY. *The Responsi-*

*bilities of the Training School for Teachers in Matters of Hygiene.* 40-43. The training school has three obligations: First, to make its environment sanitary and hygienic; secondly, to turn out graduates whose physical influence is hygienic; thirdly, to supply the school child, through its teachers, with information that will enable him to take part in solving the health-problems of humanity. GUY MONTROSE WHIPPLE. *The Instruction of Teachers in School Hygiene.* 44-53. Discusses the present status of the teaching of school hygiene, the ways in which such teaching may be encouraged, how teachers in the field may be reached, how much time is needed, and outlines the contents of a course in school hygiene. HENRY H. GONDARD. *Research in School Hygiene in the Light of Experiences in an Institution for the Feeble-Minded.* 51-53. A brief account of investigations, chiefly physical growth, undertaken at Vineland, New Jersey. THOMAS A. BALLIET. *Undergraduate Instruction in Pedagogy.* 63-69. A distinction ought to be made between undergraduate and graduate instruction in pedagogy. The former work should aim to bring before the student the larger problems of education and to give him practical training in actual teaching, by special emphasis upon methods and by school visitation. ANNA J. McKEAG. *The Department of Education in Colleges for Women.* 70-73. In introductory courses, observation of children and of school work should be done, and informational and inspirational aims are as valuable as the purely cultural aim. Narrow technical courses should be given to graduate students, who should be encouraged to give a year to systematic professional preparation for high-school teaching. W. S. SMALL. *The Health of Teachers.* 78-80. Scientific, humanitarian and economic motives should impel us to make a careful study of the health of teachers. WALTER LIBBY. *An Experiment in Learning a Foreign Language.* 81-96. An interesting contribution to the literature of experimental pedagogy undertaken to "discover the relative value of making the word or the short sentence the unit in modern language instruction for different types of learners." The results distinctly favor the sentence method and bring to light important individual differences in manner of learning. FRANK A. MANNY. *Communication.* 97-103. Explains the valuable results that have followed the use of a device for classroom work termed "the weekly communication." Each student reports once a week concerning his outside reading, required or voluntary, that bears on the course. In time the communications develop discrimination, active thought, and become instruments of value both to student and teacher. Sample communications are given. HARRY PREBLE SMITH. *Her Little Girl.* 104-110. "An account of an imaginary playmate that had a continuous development of some ten months, and an existence of over two years." The imaginary character first appeared at three years eight months. GEORGE E. EMERY. *Medical Inspection in Two Wor-*

*chester Schools.* 111-118. An account of the work done and the difficulties encountered. The statistical results occupy three pages of tables, those showing the condition of the teeth being specially valuable.

No. 2. June, 1910. J. E. WALLACE WALLIN. *The Moving Picture in Relation to Education, Health, Delinquency and Crime.* 129-142. The moving picture for many reasons exerts a powerful appeal. It is an institution that has come to stay. We scarcely realize its educational possibilities. But at present it constitutes an hygienic and a moral menace. Investigations demonstrate it to be powerfully suggestive. School and civic authorities are here confronted with a vital problem. HARRY P. WELD. *The Mechanism of the Voice and Its Hygiene.* 143-159. Brief explanation of the anatomy and physiology of the vocal organs, with special reference to breathing, the registers, growth of the larynx, and vocal resonance, followed by a statement of certain hygienic principles.—avoidance of strain, question of singing during mutation, and the removal of obstructions. G. STANLEY HALL. *General Outline of the New Child Study Work at Clark University.* 160-165. Clark announces the establishment of a "Children's Institute," with an ambitious program, to include the collection of literature, the arrangement of conferences and the dissemination of information with regard to such aspects of paidology as natality, health and disease, subnormal development, crime, vice, linguistics, experimental didactics, moral and religious education, and pedagogical museums. The six following articles explain the program more fully. LOUIS N. WILSON. *Library Facilities for the Work of the Children's Institute.* 166-175. Gives lists of available bibliographies, journals and books on varied phases of child study. THEODATE L. SMITH. *Correspondence Department of the Children's Institute.* 176-182. Shows usefulness and need of a central institute for correlating the work of diverse agencies interested in the child and gives a list showing existent types of such agencies. WM. H. BURNHAM. *School Hygiene in the Children's Institute.* 183-188. Recounts work of school hygiene department at Clark,—publications, equipment, library facilities, courses, etc. HARRY W. CHASE. *Work with the Backward and Subnormal in the Children's Institute.* 189-203. Outlines tentative plans for clinical work. AMY E. TANNER. *Experimental Didactics in the Children's Institute.* 204-212. Debates scope of experimental didactics as contrasted with experimental pedagogy, tells of equipping a laboratory, of classifying 50,000 observations of children, and suggests what such a department might do. JOHN A. MAGNI. *Department of Child Linguistics.* 213-218. This subject is still largely undeveloped; reliable data and methods are first needed. Proposes conferences and experimental work. CLARA SCHMIDT. *The Teaching of the Facts of Sex in the Public School.* 229-241. Will be reviewed later. WALTER LIBBY (and five others).

*The Contents of Children's Minds.* 242-272. Briefly summarizes previous studies of this kind, and presents results obtained by various methods applied (*a*) to a five-year-old boy, (*b*) to children three to seven years old in an orphanage, (*c*) to first-year high school pupils, (*d*) to white and colored children in fourth and eighth grade work. The contribution is accompanied by extensive tables that are worthy of study, while the questionnaires used will be of value for subsequent comparative work.

## PUBLICATIONS RECEIVED TO FEBRUARY 1, 1911.

(Notice in this section does not preclude a more extended review.)

*Addresses and Proceedings of the National Education Association, Boston, Mass., 1910. Winona, Minn., 1910. Pp. 1124.*

Perhaps the most important portion of this bulky volume is the report of the Indianapolis meeting of the Department of Superintendence, dealing with the differences of children in mental alertness, moral responsibility, mental attitudes, tastes and tendencies, physical condition, environments and vocational aims. Pages 149-275.

J. M. BALDWIN. *The Individual and Society.* Boston: Richard G. Badger, 1911. Pp. 210. \$1.50 net.

An English edition of Baldwin's *Psychologie et Sociologie* first published in the *Bibliothèque Internationale de Sociologie*. The author states that this is, in a sense, a résumé of his former writings.

C. P. COLGROVE. *The Teacher and the School.* New York: Charles Scribner's Sons, 1910. Pp. xxii, 406.

In spite of the colorless title, this book is a very good treatise on school management. It consists of four parts: (I) The making of a teacher; (II) The teacher as organizer; (III) The teacher as instructor; (IV) The teacher as trainer. President H. H. Seerley supplies an introduction.

J. M. COULTER, J. G. COULTER AND ALICE PATTERSON. *Practical Nature Study and Elementary Agriculture.* New York: D. Appleton & Co., 1909. Pp. x, 354.

An excellent manual for teachers and for normal-school students. The introductory chapters on the function of nature study in education are especially to be commended to the student of general education.

A. D. DEAN. *The Worker and the State.* New York: The Century Company, 1910. Pp. xx, 355. \$1.20 net.

This book will be reviewed in a later issue of the JOURNAL.

HENRY H. GODDARD. *Heredity of Feeble-mindedness.* Reprinted from *American Breeders Magazine*, 1, No. 3, 1910. Pp. 165-178.

The author presents and explains fifteen charts, which show in graphic fashion the family histories of as many inmates of the

Training School for Feeble-minded, at Vineland, N. J. In one family, out of 319 members 119 are feeble-minded, and only 42 are known to be normal.

HANS GROSS, J. U. D. *Criminal Psychology: A Manual for Judges, Practitioners and Students.* (Translated from the 4th German edition, by HORACE M. KALLEN, Ph.D.) Boston: Little, Brown & Company, 1911, Pp. xx, 514. \$5.00 net.

This is the second volume in a series of nine translations of important foreign works upon criminology. The series, which is known as "The Modern Criminal Science Series," is published under the auspices of the American Institute of Criminal Law and Criminology. Further comment will appear later.

CHARLES ATWOOD KOFOID. *The Biological Stations of Europe.* Bulletin 440. Washington: Government Printing Office, 1910. Pp. 360.

An invaluable compendium for universities or other institutions contemplating the establishment or enlargement of biological laboratories or aquaria.

W. E. MCGOWN. *Report on the Hygienic and Sanitary Condition of a Public School Building.* Reprinted from the Pedagogical Seminary, Vol. 17, December, 1910. 480-490.

An excellent illustration of the kind of work that can profitably be undertaken by university students of school hygiene. Incidentally the report led to a decided improvement of the conditions described.

L. MCC. TURNAN. *The Personal Equation.* New York: Atkinson, Mentzner and Grover 1910. (With an introduction by J. L. Hughes.) Pp. 248.

A "reading-circle" book, the materials of which have been drawn very largely from biography. A very good book of its class.

KARL T. WAUGH. *The Role of Vision in the Mental Life of the Mouse.* Reprinted from The Journal of Comparative Neurology and Psychology, 20, No. 6, December, 1910. 549-599.

The mouse distinguishes fairly accurately between different brightnesses of white light, and can discriminate between red and white or red and blue which are of the same brightness to the human eye, but there is no evidence of discrimination between red and green or blue and green. The mouse has no cones and no trace of a fovea. The rods are equally and quite widely distributed over the

retina. There is little evidence of the clear perception of form or distance, and the mouse seems to depend chiefly on smell and the kinaesthetic sense for his orientation, rather than on vision.

J. S. WELCH. *Literature in the Schools*. New York: Silver, Burdette & Company, 1910. Pp. 236.

"Literature selects incidents, types, scenes, in nature and human life, and idealizes them." "Through the splendor of the large, the heroic, the sublime, the universal, shines the glory of the commonplace." The purpose of literature as a subject for school study is to inspire the pupil with the ideals which are crystallized in literature. The author describes in detail some of the methods by means of which this function may be fulfilled. On the whole, his treatment of the topic is suggestive, but its virtues are sometimes counterbalanced by his anticipation of objections and criticisms.



Peter Sandiford

## THE SUPERNORMAL CHILD.

DR. WILLIAM STERN.

*Breslau, Germany.*

### II.

The thesis set forth in my first article,\* that something must be done for the supernormal, should hardly meet with serious opposition, but lively discussion will be needed before agreement is reached as to what must be done. My proposals are, in fact, intended primarily to incite discussion.

In my opinion we must give separate consideration to two problems in the pedagogy of the supernormal, to the practical problem of development and protection, and to the theoretical one of the determination, investigation and examination of children of superior endowments.

A. *The practical problems* differ, again, according as we are concerned with exceptional all-round ability (superior intelligence) or with specific talents, because the proper pedagogical influence is to be sought for the former within, but for the latter without, the school.

A very interesting present-day tendency is the *psychologizing of school organization*; in the organization of schools and classes—which has hitherto been determined by considerations of social standing, sex and age—purely psychological considerations, namely, differences of ability, are now playing a rôle. We are coming to see that in classes whose members possess widely different capacities individual treatment is neglected, and at the same time the fulfilment of the function of the class is endangered. From the realization of this situation came the idea of grouping into classes those of psychologically like attainments. This division of classes has, however, been carried out thus far in a very one-sided way, that is, only by separating from the average those who fell below it:

\*See this JOURNAL, March, 1911.

the members of the Sickinger "furthering" classes,<sup>1</sup> of auxiliary schools and of institutions for the feeble-minded represent, accordingly, three different psychological grades of subnormality.

This system, of necessity, must now be supplemented on the other side by the instituting of classes for supernormal children. Of course, if such "select classes" are introduced at all, they must be established for the common schools as well as for the higher schools, since no barriers of social station or of the purse should stand in the way of the development of the mentally gifted. So far as the German common schools (*Volksschule*) are concerned, we are already waking to the realization of the fact that the establishment of "élite-classes" follows as a consequence of the Sickinger system, and some cities, *e. g.*, Charlottenburg, are proceeding to establish these classes. As concerns higher schools, J. Petzoldt, head master at Spandau, as long as five years ago called for the establishment of special schools for the exceptionally gifted (in a pamphlet entitled *Sonderschulen für hervorragend Befähigte*, Teubner,

<sup>1</sup>In the year 1899 Dr. Sickinger, the superintendent of schools at Mannheim, Germany, attempted a classification of the *Volksschule* pupils on the basis of their abilities, and based the grouping of children for instruction upon this classification for ability. Three types of classes are, in the main, to be distinguished:

(1) Classes for pupils capable of doing normal work at the normal pace. About 90 per cent. of all pupils are found here.

(2) Classes for pupils of lesser ability (the "dregs" or "ballast" pupils), which are known as "repeating" or "furthering" classes (*Vörderklassen*), and which aim to do a lesser amount of work at a slower pace. In these classes, which are limited to 30 pupils each, the pupils are again subdivided into two sections, one for the stronger, the other for the weaker pupils. The two sections receive a portion of their instruction in common, and another portion (about one-third of it) separately. The transfer of a pupil to one of these "furthering" classes is done only after the filling out of a rather elaborate "transfer card," which indicates the educational progress of the pupil to date, his personal history, home conditions, previous school history, nature and reasons of his backwardness, physical and mental peculiarities, special inclinations, etc.

(3) Pupils whose mental equipment is so meager as to unfit them for profitable work in the furthering classes, but whose ability is above the level of idiocy, and who offer hope of mental development under skillful individual treatment, are transferred to a third type of class known as the "auxiliary school" (*Hilfsschulen*.)

For further information concerning German auxiliary schools, the reader may consult Bulletin No. 3, 1907 (whole number 376), of the U. S. Bureau of Education.—*Editors.*

1905), though he did not, so far as I know, obtain the response that he deserved.

Of course, the élite-classes should not be established as a select institution, contrasted with the ordinary school system, but should run parallel to the system, at least from the middle of it onward. Into the élite-classes should be transferred only those pupils who were surely gifted with superior *general intelligence* (not those who have only some special gift); moreover, the supernormality, to justify enrollment, must be of an extraordinarily high degree, so that these classes should represent the strictest selection. (Petzold, for instance, proposes that in a large city like Berlin, the 20 most gifted of all the pupils of the *Quinta* (age 10-11 years) should be sought out each year, and that from these there should be formed an élite-class, which should then continue through the other grades.)

If suitable teachers are found for such classes and schools, and if they are not made too large, their achievements may be quite extraordinary. By following a very different pace from the ordinary classes, by broadening and deepening the cultural material, by minimizing drill and mechanical aids to memorization, by cultivating especially the habit of independent mental review and assimilation of the subject-matter and by free election within the subjects of instruction (particularly in the upper classes), the superior capacities of these pupils would be given the possibility of development for which their birth had fitted them; moreover, by reason of the quite unusual demands made upon them, self-discipline and the spirit of conscientiousness would also be developed in a manner totally impossible for such pupils in the ordinary school. And there would be developed for society a class of leaders equipped with really deeper and broader training.

It cannot be denied that, on the other hand, there are some elements of danger in such élite-classes. Especially to be feared is the development of intellectual arrogance, because the selected scholars may feel that they are, by the fact of their selection, officially stamped as individuals of the first rank. The only way in which this can be counteracted, as Petzold has already pointed out, is by making continuance and advance-

ment in these classes conditional not simply upon the possession of a fortunate mental capacity, but rather solely upon persistent exertion of effort, and upon the faithful and earnest performance of duties; those whose exceptional intellectual ability is not conjoined with strength of character soon drop out of their own accord.\* A second danger is that the unusual requirements may result in overburdening the élite-pupils; for this reason especial care must be exercised over the hygienic conditions that prevail in these classes. A third source of danger lies in the arbitrary nature of the selection; this must, unquestionably, be so arranged as to avoid the customary and all-too-crude examination system of every-day pedagogy, and must rest on a scientific basis (see below). All things considered, these dangers, though they certainly exist, can, I believe, be so far minimized that they will be more than offset by the extraordinary countervailing advantages for the individual and for society.

Our pedagogical problems take on another guise when we turn to the treatment of supernormality of the specific type. For children of this order, the school of itself can do but little. The most that can be done is to give more heed to the training of the special endowment by assigning the pupil to a particular type of school. The difference between humanistic and scientific institutions is one of the most obvious instances of this situation, because this difference corresponds to a differentiation of mental aptitude that makes itself clearly evident, at least as early as the middle portion of the school period; but, unfortunately, parents suffer themselves to be guided in the choice of a school by the nimbus of a particular type of school, by its distance and other such factors more than they do by the nature of the special bent that their child displays. And thus it may come about that a pupil who has exceptional talent for scientific observation and investigation is found among the incapable, indolent and misunderstood members of a hu-

\*Naturally, care should also be taken to avoid the use of the terms, even in naming the classes, that give expression to the idea of superiority: the terms "select" and "élite" classes have been used in our discussion simply to make our meaning more intelligible.

manistic high school (*Gymnasium*)—a situation to striking instances of which the radical opponents of the German gymnasium are, as we all know, fond of referring, and that furnishes the basis for much unjustifiable generalization.

As for the pupils in the common schools (*Volksschule*), it is essential that the school authorities recognize conspicuous talent among them (of this we shall have more to say), and that they afford them the opportunity, outside the regular school program, to nurse and develop their gifts. Why, for instance, when extraordinary artistic talent is shown, should we wait until schooldays are over before making special provision for it? Pupils who possess such talent may very well dispense with the regular school instruction in drawing, and instead be assembled in a special art class in charge of teacher trained in art. Similar special "talent-classes" might be formed for the exceptionally musical; perhaps, also, for a number of other supernormal special talents, *e. g.*, mathematical, technical, linguistic. This plan should be arranged in such a way that the general training should not suffer thereby; overburdening might be avoided by dispensing with the corresponding subjects in the regular school classes. Tuition in all these special classes must, of course, be as free as that in the common school. There is opened here a rich field for new forms of activity, especially to municipalities, that will yield direct and ample returns. For the primary benefits of talent that springs from the masses, and that is thoroughly cultivated, will accrue to the community from which it sprang.

And finally, let us consider the choicest flower of special endowment—the special-genius of childhood, the infant-prodigy. For these children, it is quite impossible to institute official measures; only private ones are feasible, and these must be freed from the fortuitous character that they have hitherto possessed. *Our patronage should be organized*, perhaps in the form of a society for the education and protection of supernormal children. Such a society would work to combine the moneys donated by individual patrons into a fund of great effectiveness; it would be its duty to secure and collate information concerning budding prodigies and exceptional youth-

ful talent, to investigate these children, to protect them from exploitation by ambitious parents, to test the degree of their endowment and their other mental and physical traits, and finally, to take permanent charge of those who are found, on the basis of these determinations, to satisfy the highest requirements. The care thus contemplated should include provision for the most advantageous development of the talent and the ensuring of the requisite means for subsistence, and also provision for adequate and harmonious all-around development and the assurance of the ripening of the child's abilities in complete freedom from publicity.

The possibility of such an organization is demonstrated by England's example; in that country there has existed for some years a society of this kind. This "Education Aid Society" has, it is true, certain religious restrictions (for Jewish children), and it is very limited in efficiency (it has at its disposal an annual budget of some \$6000, by means of which it supports 44 young people—the support being necessarily confined to the granting of free tuition). This society, however, does attempt to carry out with every precaution the psychological principle of selection on the basis of superlative talent that we have here laid down. In its report it says:

"The purpose of the society is to provide educational opportunities for those whose natural gifts give them a claim to a high rank in the professional world or in the sphere of the liberal arts, but who are, by financial circumstances, prevented from entering upon the career which would, otherwise, be theirs by right. The society realizes, however, that, under present social conditions, only the promise of exceptional ability gives it the right to take a poor pupil from his natural environment and to prepare him for a professional or artistic career."

The work of the society is carried on in four sections: one each for music, constructive art, literature, and the exact sciences. Each section has expert advice from the best specialists and has a group of assistants. The experts are asked both to make a thorough investigation of the applicants and to recommend for assistance only such as inspire a most favorable impression of their ability, and also to keep a constant watch over the endowed students and to determine their progress from time to time by examinations.

Naturally, it requires of a patron some self-effacement to turn over to a society the free administration of funds that he has contributed and to give up in its favor direct personal contact with his own protégé, and, on account of the intense individualism of the German people, such an organization will, perhaps, have greater opposition to overcome in this country

than elsewhere. Nevertheless, the plan must be tried, for there is no other way to escape the medieval type of almsgiving, with its fortuitous character and its waste of energy.

Finally, the question should be raised whether legal measures should not be taken for the protection of infant prodigies, so that they may escape the perils that we have mentioned as incident to a public career. Our present law governing child labor is inadequate for this purpose, since it explicitly permits the exhibition of children for artistic exhibitions.

*B. Theoretical problems.* The successful accomplishment of the practical measures for the assistance of supernormal children that we have outlined above is, however, quite impossible if we do not, both before and during the work, satisfy another requisite, namely, the *scientific* investigation, testing and discovery of supernormal endowments.

What an enormous amount of industry and scientific insight is nowadays expended upon the detailed investigation of subnormal and abnormal children, upon their various forms and types of development and their dependence on environment and heredity—and how scanty, in comparison with this, is our knowledge of supernormality in youth! Biographical comments on the boyhood of great men and scattered accounts of the sensational performances of infant prodigies have, until very recently, supplied our only material—a material that, neither in range or reliability, satisfies in the least the demands of scientific knowledge. What we need is a systematic *study* of supernormal children, a study that must be directed especially to the development of their *mental* traits, but that must also include consideration of the inherent physiological, anthropological, sociological and hereditary problems.

A few of the questions that this new branch of child psychology must seek to solve have been mentioned already; this is not the place to set them forth in detail. It may be pointed out, however, that all of the methods that have been developed by modern child study must be utilized in these investigations. It will be necessary both to “psychograph” exceptionally gifted individuals as completely as possible and to follow their subsequent mental development, and also to work out types

and correlations by the comparison of numerous individuals. We must utilize both the critically elaborated biographies of the childhood of historical characters and the direct results obtained from observation and experimentation with living supernormal children; we must systematically collect and subject to analysis those tests that give evidence of talent in such children, *e. g.*, drawings, plastic work, technical creations, poems, compositions, etc.—all this we must do, and much more.

It is true that here and there something is being done even now in the direction that we have indicated,<sup>1</sup> yet it is unquestionable that such a treatment of the psychology of the supernormal as is essential for the foundation of pedagogical measures cannot be gained by the methods of child study now being followed by institutions and collaborators. For the task is comprehensive enough to engage the attention of an entire staff of investigators and to merit a large outlay of money, and this brings us to the need of a great *central institute for child study*, the establishment of which must be the work of our newly-founded "Federation for School Reform."

The strictly scientific investigations will doubtless lead to the working out of such methods for *testing intelligence and talent* as will meet the difficult requirements of supernormal pedagogy. What we are testing at present are performances, things done, and these are themselves the uncontrollable results of a great variety of conditioning factors, *e. g.*, practice, training, opportunity for study, industry, disposition, etc. What we *want* to test is a single one of these factors, namely, the degree, type and possibility of development of native disposition (endowment). Not until we have developed a reliable method for measuring this factor—by what we term "mental tests"—can we avoid being arbitrary in the assignment to élite-classes of children of exceptional all-around ability, to

<sup>1</sup>The *Zeitschrift für angewandte Psychologie* (edited by Stern and Lipmann) affords an opportunity for bringing together new investigations in the monographs that have appeared in it dealing with supernormal ability manifested by children in drawing, music and feats of memory.

(Mention should be made here also of the establishment at Clark University of a Children's Institute, one of whose functions is the collection and systematic study of these products of exceptional youthful talent. The columns of this JOURNAL are also open to all who may contribute to the program that Professor Stern lays down).—*Editors.*



special classes of children of exceptional special gifts and in the appraisal of infant prodigies. When this desideratum is attained we may hope that the treatment of the supernormal may steer wide both of the folly of sheer pedagogical routine and of the blind prejudice of the enraptured parent who sees in every and any unusual achievement the infallible token of genius.

All these hopes, it is true, are as yet but dreams of the future, and of a distant future at that. Still, it seems necessary even now to sketch out the path that must be followed if we are to make any progress at all. For it is impossible to conceive of a happy solution of these important problems unless the educated public, as well as a narrow circle of professional psychologists, take an interest in the problems and are stirred to a more active participation, especially by rendering possible investigations on a more extensive scale.

The seemingly Utopian character of these views need not alarm us; least of all, at the present time. Only five years ago the idea that there ought to be special judges for children seemed quite as Utopian, yet today they are an accomplished fact. Quite as quickly was the introduction of school physicians brought about, though at first strenuously opposed by educators as an intrusion.

Quite the same thing will occur in the case of school psychologists; they will come, because they are necessary. The need of a permanent examining and supervising bureau of school psychology (of whose tasks the control of supernormal children is but one) will make itself evident, and will lead to the appointment of specialists and the establishment of municipal bureaus for the conduct of tests.

Moreover, there is one line of psychological procedure that can be carried out right away in the interest of the pedagogy of the supernormal, namely, the *determination* of supernormal children. We know precisely how many and which of those children who constitute the compulsory school system of a great city are myopic or crippled, but we have no notion how many and which of these children are exceptional draughtsmen, musicians or mathematicians. Any one of us could embark upon real voyages of discovery in his own little com-

munity, much as Kerschensteiner once did in Munich for a single special form of talent. This task of simply *picking out* the supernormals from the mass of children is so simple, compared with the problems of investigation and testing that we have discussed, that satisfactory methods for its accomplishment may even now be elaborated. Thus, for instance, all the school children of a large city might be tested, one year for their general intelligence (perhaps by the improved Binet method), the next year for their ability in free-hand drawing, the third for their musical ability, and so on. If this sequence is repeated every six or seven years, then the city authorities will be supplied with a general scheme of the distribution of abilities in the rising generation—information that can but be of the greatest significance for varied pedagogical and educational undertakings.

If my sketchy treatment of the subject has sufficed to convince my readers that the problem of the supernormal child is in urgent need of discussion, and if, by formulating a few of the cardinal issues involved therein it can bring about such discussion, it will have accomplished its purpose.

## THE NEW CLINICAL PSYCHOLOGY AND THE PSYCHO-CLINICIST.

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### PART II. THE PSYCHOLOGICAL CLINIC AND THE PUBLIC SCHOOLS.

6. *The laboratory of psychology and hygiene in the public schools.* Unquestionably one of the most fruitful fields for the application of clinical psychology is education. Nowhere are the practical benefits to be derived more patent. American public schools have shown commendable enterprise in securing increased physical comforts, the erection of costly material plants, the equipment of expensive *laboratories for instruction*, the organization of new courses to meet the enlarged demands of the altered social and industrial conditions of the twentieth century, but it must be confessed, to our shame, that they have lagged considerably behind the institutions for the abnormal and defective in respect to the establishment of *laboratories for discovery and research*. So far as promoting or conducting departments for the scientific study of the problems which concern the normal health and development of the child's body and mind, the conditions under which such development can be most economically secured, the questions of the most expeditious learning and the most economic teaching methods, of fatigue, of the length of the school day and of the school year, of the scientific examination, classification, segregation and treatment of the retarded and delinquent—they have done practically nothing. The one outstanding exception is the public schools of Chicago, in which a department of child study and pedagogic investigation was established in 1899 (14). This department, which now commands the services of Dr. D. P. MacMillan (director) and Dr. F. G. Bruner, has, since its organization, made various studies of normal and special chil-

dren—the blind, deaf, truant, retarded, etc.—has regularly examined candidates for admission to the city normal school, and has issued a series of valuable annual reports embodying its findings.

During the last few years there has come a radical and gratifying change of attitude on the part of educational experts toward the exceptional child—the *retarded* (idiot, imbecile, moron, laggard), the *accelerated*, and the cripple, epileptic, speech defective, blind, deaf and mute. It is now recognized by the intelligent public everywhere that the deviating child sets a special problem. So enormously has the number of deviating children multiplied—on the average one-half of all the pupils in the public schools are behind grade, and the number of feeble-minded and epileptic of school age is probably in excess of 200,000 in the country at large—that to neglect their educational and custodial care and treatment would be to invite national disaster. The only effective method of dealing with defective children is to segregate them into special groups and to provide special treatment, care, training or restraint. Not only will this policy tend to remove dead weights and irritating impediments from the regular classes, so that the typical, hopeful, progressive children may receive their just dues, but in the long run it will prove the only way in which the deviating child can be saved to society from a life of idleness or crime. He can be saved only by being sufficiently prepared to discharge the responsibilities of citizenship or, in cases where special training proves unavailing because of permanent arrest or defectiveness, by being isolated from society in custodial institutions. There is, then, a vital school problem in connection with the special child. It can be successfully solved only by scientific investigation by a qualified expert.

Owing to the combined influences of the laboratories of the Chicago schools, the University of Pennsylvania and Vineland, psychological tests are now being carried out on a small scale in a number of public-school systems of the country,<sup>1</sup> notably in Philadelphia (under the control of a special committee);

<sup>1</sup>Mention should be made of the Groszmann School for Nervous and Atypical Children, conducted at Plainfield, N. J., by Dr. M. P. E. Groszmann, for the expert study and treatment of deviating children.

and in Seattle and in Rochester, where small psychological laboratories have been established (1). Not only so; one State (California, in 1908) has authorized the establishment of departments of "health and development supervision" in the public schools under the control of boards of education or of school trustees. The program of work contemplates the annual physical examination of pupils and a "follow-up" service, in order to correct physical anomalies and to provide the conditions essential for the maintenance of continuous health and normal growth; the adjustment of school activities to meet the developmental needs of the individual in respect to health and growth; the scientific, systematic study of mental retardation and deviation; proper sanitary supervision; the physical examination of candidates for teaching positions and of teachers in service to determine their vital fitness and the amount of work which may reasonably be required of them without imperiling efficiency, and the appointment of expert educator-examiners to conduct and supervise the work. These examiners must qualify as experts in child hygiene and physiology. Above all, they should be trained in the methods of clinical psychology and mental diagnosis. The projected California work thus rests upon a far broader basis than the system of medical inspection now in vogue, and will make it possible to grade children in health as well as in studies. The law is not mandatory. Up to the present moment only one city, Los Angeles, has established the department, and only one certificate of fitness for the work has thus far been issued, namely, to Mr. George L. Leslie, who is director of medical inspection in the Los Angeles schools, and who is the sponsor for the law.

#### THE POSSIBILITIES OF A BUREAU OF SCHOOL RESEARCH.

In view of the fact that the intelligent educational public has now accepted the proposition that the changed industrial and social conditions of modern life necessitate the organization of various new school agencies—departments of medical and dental inspection, of school hygiene, of experimental pedagogy, of social survey work, of psycho-clinical laboratories for the examination of exceptional children—it seems well to discuss the functions of some of these departments, the nature

of the examinations which should be given and the qualifications needed by the examiners, particularly the psycho-clinical examiners.

First, a warning. The results of these various branches of investigation and study are liable to run to sand unless they are properly unified, correlated and brought to a focus. There is need, therefore, of a central, unifying *bureau* or *department of school research*, in charge of a *director of school research*, where the data collected by the various examining agencies may be gathered, preserved, compiled, compared, correlated, interpreted and turned to practical use. So impressed are we with the need and with the possibilities of a bureau of school research that we wish, before recurring to the question of the psychological clinic in the school, to set forth in some detail our views of what this central institution might be.

The *director* of such a bureau should be an expert in child, educational and clinical psychology, who has done distinctive work in these fields. He should be thoroughly familiar with the methods employed in these sciences and in experimental pedagogy, and should have some knowledge of medical inspection work (a minimum of knowledge in regard to physical diagnosis and the signs and symptoms of physical defectiveness). He should be a technical educationist, with practical teaching experience, preferably in public and teacher-training schools, and should be able to plan and direct the work along broad, progressive lines. His should be distinctly a position of leadership in the educational work of the schools, and nothing but a thoroughly trained, broad-gauge expert should be able to qualify.

The *materials* to be collected and organized by our bureau should be derived from the following sources:

1. *Records and charts of physical (medical and dental) examinations*—nasopharyngeal and dental charts, showing the locations of nose and throat obstructions and defective dentures; vaccination records and charts, showing the dates of inoculation and the number of vaccine scars; abnormalities of the respiratory, circulatory, nutritive and nervous systems; sensory defects (visual, auditory), etc. The results of these examinations should be recorded annually, if possible, on

duplicate cards, which should accompany the child from grade to grade. The originals should be filed in the bureau of records.

It would lead the discussion too far afield to consider what should be the detailed functions and relations of the department of physical or medico-dental examination. The matters in dispute revolve around the questions whether the work should be entirely confined to examination, or whether it should include free treatment, at least for the minor ailments (22); whether the system should be under the control of boards of health or of school boards; whether inspection should be supplemented by follow-up educational care, treatment and supervisory work by a corps of school nurses; both in and out of school; whether it should embrace the sanitary inspection and supervision of the school plant; whether it should include instruction and supervision in individual and school hygiene; whether it should include provision for, and supervision of, school lunches, gratuitously available to indigent anemics, for school baths, gymnasias, etc. These questions cannot be answered in the abstract; in the near future they will loom large in the educational thought of the day. They are one phase of the large eugenics movement which has recently been forced into the focus of public attention by the threatened dangers of national degeneracy and racial decay of highly civilized races—dangers which are evidenced in a lessened rate of fertility under the conditions of civilized life (which is man's conscious attempt to domesticate himself); continued high infant mortality in spite of hygienic progress; the enormous presence of physical defectiveness (21, 22), and the astonishingly prolific increase of degenerate or neuropathic offspring (feeble-minded, epileptic, criminal and insane). They are questions which cannot, in the face of present conditions, be solved theoretically, but must be solved according to the exigencies of the case and according to the results of experience. The ancient Spartans found it essential to their national safety to exercise practically unlimited supervision over the physical, hygienic, social and educational regimen of the child, and they therefore removed him entirely from the family home. During these latter days we have been rapidly approximating the Spartan ideal, because conditions have been at work which have forced a return towards it. The first law of individual as well as national life is the law of self-preservation; against this primal law preconceived notions and paternalistic or communistic phobias avail naught. The patrons of the schools demand, as of right, that the schools shall institute those agencies and practices without which they cannot realize proper dividends upon their investments, and without which the forces in the modern environment which are destructive of the public weal cannot be successfully combated. Ultimately any measure will be demanded

in the schools which is essential for national self-preservation; this fundamental imperative will take precedence over all other considerations.

There is another important question affecting medical school inspection which we can merely raise: who should be eligible for appointment as medical or physical school inspectors? Many of the present incumbents possess neither technical training nor interest in the work. That is one reason why so much of the inspection work is thoroughly unscientific. A class of experts for this work does not yet exist, because at the present time there is probably not a university or medical school in the country that provides special, technical training in medical school inspection. Recently courses of this character have been organized in the University of Pennsylvania (by Dr. W. S. Cornell). Until we secure a class of expert school examiners—specialists in the neuro-physical and developmental defects and maladies of childhood, and in the theory and practice of dento-medical school inspection—appointees should be selected from the paidologists or from the general medical practitioners and dentists who show a vital interest in the distinctive problems of medical school inspection.

2. *Sociological data (and personal anamnesis).* We cannot satisfactorily diagnose a subnormal or defective pupil by merely examining his *physical organism*. There are other influences, hereditary and environmental, which have contributed to make him what he is. These we must understand. We must know something of the *social organism* of which he is a constituent member—something of his home, his community, his street life. The out-of-school activities and the economic, sanitary, hygienic, moral and intellectual conditions of the home and neighborhood often make or mar the individual. Properly to diagnose his condition we must know something about his food and drink, about the adequacy of his raiment and sleep, about the purity of the air he breathes, about the wholesomeness of the games and amusements which he enjoys and the resorts which he frequents, about his past habits and diseases, etc. Particularly important are "case studies" of early dangerous tendencies, disorders or diseases which are "prodromal" of oncoming adolescent or adult instabilities, neurasthenias and psychasthenias. And properly to estimate his hereditary dower—his inborn capital or native handicap—we must know something of the stock from which he springs.



It is not possible to determine offhand which of these two factors—heredity or environment—is most productive of degeneracy; the view that acquired degeneracy exceeds the inherited has recently been gaining ground, perhaps as a reaction against the Italian or Lombroso school of criminologists, who maintain that the degenerate (specifically the criminal) is born, not made. Yet recent heredity studies of feeble-mindedness show the preponderant influence of neurotic ancestral strains. Be this as it may, it is unquestionable that a *vast amount* of degeneracy is acquired from, or accentuated by, a bad environment; from physically and morally unclean slums, from squalid or unhealthy homes, from vicious resorts, social vices, unhygienic school practices and habits, etc. The first treatment which a child reared in the underworld needs is prophylactic: he must either be rescued from his evil surroundings or his environment must be reformed. Then he must be supplied with proper training, food, sleep, exercise and clothing. Instances of children who have been transformed in body and mind by these measures have been frequently recorded; modern hospital schools (such as Witmer's) or schools of the type of Groszmann's are demonstrating what can be done through the work of social reclamation.

Obviously it would be folly to make the social survey include all the pupils of the school. It should include only the problematic or defective cases. Much information can be gathered, of course, by teachers, principals and school nurses, but a field worker, trained in social survey work, should be added to the staff.

3. *Pedagogical records from the schools.* The bureau we are advocating should also keep on file the pupil's school reports and records, particularly the records of the "problem" pupils—the special, slow-progress cases, truants, etc. These records, to be made out by classroom teachers and principals, should contain facts in regard to the child's age and grade (pedagogical retardation), the amount and type of work that he has been able and that he has not been able to do, his attitudes, dispositions, demeanor, behavior, dominant interests and aversions, regularity of attendance, etc. Such records will attain a unique value when studied in the light of the data from other sources.

4. *The results of controlled educational experiments.* A department of *experimental pedagogy* should be one division of a complete bureau of school research. This department should study, under principles of scientific control, the im-

portant school problems in pedagogy: methods of teaching and learning various branches, rest and work periods, fatigue, recreation, the relation of temperature to working efficiency, the content and articulation of courses, etc. Some of the problems would be solved experimentally in the laboratory; others could best be solved by controlled school tests, and others would be studied in special experimental schools. A part of the time of the laboratory connected with the Chicago schools is devoted to problems of this character. The results of the pedagogical experiments should be correlated with the other data in the bureau.

5. *Psycho-clinical records from the department of clinical psychology.* One of the most important divisions of the bureau should be a laboratory of clinical psychology for the *individual* study of pupils, particularly subnormal, supernormal<sup>1</sup> and delinquent children. The central aim of this department—we shall discuss it somewhat in detail presently—should be the scientific investigation of *abnormalities of development* and the plotting of *efficiency curves* for individual defectives.

Conceived in this large way, the bureau of school research would become a large scientific, educational clearing-house, a vital agency for the scientific correlation of pedagogical facts and a potent instrument for the dissemination of reliable educational data. It is only when we view the child from all angles—from the bodily, the psychical, the social, the pedagogical, the clinical—that we are in a position to understand him, and that we are able to deal effectively with the problems of defectiveness. Perhaps we can best illustrate the point we wish to make by reference to the question of *retardation*, which is a far more complex question than would be supposed at first blush. A child has at least four ages: a chronological, a physiological, a pedagogical and a psychical. So far as the *chronological* age is concerned, there can be no question of retardation; a child born precisely 15 years ago is chronologi-

<sup>1</sup>The plan of work herein outlined contemplates particularly the study of normality and subnormality; but, as Dr. Whipple suggests in the March number of THE JOURNAL (p. 165), it is equally applicable to the study of supernormality. But to be able to determine the nature of either of the departures from the type, we need reliable normal norms—a crying need to which reference will be made presently.

cally exactly 15 years old. But physiologically, pedagogically and psychologically his development may spread over a number of ages. *Physiologically*, our 15-year-old child may be, say, only 13 years old; *i. e.*, measured by bodily growth or developmental changes—the degree of pubertal or pubescent development (or size, which, it is claimed, roughly corresponds: 4), or the degree of ossification of the cartilage, which is Roteh's improved X-ray method—he has the body of a normal child of 13. He is anatomically two years retarded. Similarly, our 15-year-old child may be retarded *pedagogically* three years; *i. e.*, assuming that he started school on time and has arrived at his present grade three years later than his classmates in the first grade, he has a pedagogical development of 12 years. He is pedagogically retarded either through mental defect or physical handicap. Finally, the *psychical* age of our 15-year-old may be, say, only 11; *i. e.*, he has the mental development of a child of that age. It might be assumed that the pedagogical and mental ages coincide. At times they will, but by no means always. The child's pedagogical retardation may be due to late entrance, irregular attendance, frequent transfers, lack of interest in the particular tasks set by the school, etc. Sometimes his pedagogical retardation may be less than his mental, because he has been promoted undeservedly (23); his abilities have been overestimated, owing to a heightened development of some special mental function (*e. g.*, memory), or he has been pushed forward because of the pressure brought to bear on the classroom teacher to eliminate failures or to minimize the number of non-promotions. Accordingly, the child's actual *mental* development needs to be determined independently by serial graded age tests, which are sufficiently comprehensive to include tests of the fundamental mental functions, capacities and powers. Until recently we had no such tests—no measures of mental age that have been scientifically valid. Now, thanks to the labors of Binet and his co-worker, Simon, we have a set of diagnostic tests which render it possible to ascertain, in terms of age, the *intellectual* status of a given child and the degree

in which his intellectual functions vary from the average or *typical* child of his chronological development.<sup>1</sup>

It would be presumptuous to claim that Binet's measuring scale is perfect, or absolutely accurate. It attempts to determine chiefly the *intellectual* development of a child; regarding his emotional and motor development it is almost silent. A child's mentality includes more than intellectuality; he is a being who feels and who does as well as knows, and his life success will often depend on how he feels and does. To fix a child's mental age fully, we need measures also of his conative capacity and affective development. We need especially a graded series of tests of motor performances, increasing in complexity from year to year. While this is true, it must be conceded, however, that the most satisfactory single measure of a child's mentality is the test of his intellectual development. Granted a fairly exact knowledge of this, we have a good preliminary working basis for diagnosing his mental age.

It is, furthermore, patent that as an intellectual scale the Binet-Simon tests will require revision and amplification. The tests consist of a graded series of intellectual performances which normal children of various ages (from one to thirteen) can do. The norms are based upon the results of the testing of French children selected from the poorer classes. It has not yet been shown whether the norms hold for the *typical* American child. Tests by Goddard of 1547 public-school children in New Jersey show that 554 children passed the tests corresponding to their chronological age; 599 passed tests lower than their age; 394 higher tests; 1195 passed the tests of their age or one year below or above (8a). Some of these children were undoubtedly mentally defective; others no doubt suffered from various physical defects. The Binet tests should be tried on a large scale with pupils who are physically and mentally normal (the criteria by which to select such pupils will be discussed further on). They should be applied in a *thoroughgoing* manner, so that we may know which tests are placed too high and which too low. This can only be determined by computing the per cent. of passing for each test.

Again, the tests for the higher ages are less satisfactory than for

<sup>1</sup>For an account of these tests in English, consult Goddard (7, 8), Huey (10, 11), Whipple (24) and Johnstone (Katherine). An English Version of M. Binet's Tests for the Measurement of Intelligence, Training School Record (London), November, 1910 (the tests for age 11 are here transferred to age 12, leaving 11 unsupplied; the tests for age 12 are moved up to age 15; and the 13-year-old tests, with two additions, are used for the ages beyond 15. The version, according to the writer, was submitted to Binet and met with his approval). Unusually complete record blanks for these tests have also been published by the committee on the investigation of backward children of the Philadelphia public schools and the New Jersey Village for Epileptics. Materials for their conduct may be purchased of C. H. Stoelting Co., 121 North Green street, Chicago.

the lower ages; the difficulties of the various tests under the same age are not always the same; and the tests for some ages may even be easier than tests of a higher age (*e. g.*, I have found many epileptics who cannot pass the 9-year tests, but have no difficulty with those of 10. On the other hand many who fail on the 6-year test pass on the 7- and 8-year tests). Such revision must wait until we have thoroughgoing analyses of the tests themselves (an analysis of the tests will be made in a later article, based on their use with epileptics), until an attempt has been made to gather extensive data from the schools as to what normal children of given ages can and cannot do, and until more devices have been systematically tried on children of various ages.<sup>1</sup>

Finally, the tests need to be amplified so as to measure more nearly the degree of mental *disorganization* in various psychoses, and so as to better serve the purposes of differential diagnosis. This can readily be done by including at the proper level tests of orientation, paranoidal and delusional trends, memory for remote and recent happenings, etc. With such additions, the tests can be made to measure both the extent of retardation and of disorganization.

While there thus remains much work still to be done with this measuring scale of intelligence, the fact remains that the Binet-Simon tests are the best systematic experimental device yet evolved for measuring intellectual development (the only tests which rank with them are the less elaborate De Sanctis tests); they give us the most satisfactory *preliminary survey* of the child that is available; they give us a consistent, practical, impersonal, objective, scientific method of determining psychological retardation, which is sufficiently reliable to be practically serviceable. There is no reason why these tests should not be used in all the large school systems under the direction of a qualified expert. The fact that they have not yet been brought down to the point of perfection should not hinder schools from using them now. The automobile is not perfect yet, but it can still be used to advantage.

<sup>1</sup>A plan for the observational, clinical and experimental study of the intellectual, personal, social, industrial and school efficiencies of normal, subnormal and supernormal individuals is described in a companion article in the March number of *The Pedagogical Seminary*. These two articles supplement one another.

## THE SCHOOL CLINICAL LABORATORY.

Where the establishment of a bureau of school research upon the comprehensive plan sketched above is not feasible, the most urgent need should be provided for, namely, the establishment of a *clinical laboratory* for the examination and grading of exceptional children.

This should claim first attention, because the enormous prevalence of pedagogical retardation makes this the problem of paramount importance. In New York city there are eight slow-progress pupils for every rapid-progress pupil; in a Massachusetts city the relation was found to be 21 to 1; in a Pennsylvania city, 14 to 1 (9); among 8942 graded pupils in Bureau county, Illinois, 57.5 per cent. were behind the normal, while only 8 per cent. were ahead, and among 2090 rural pupils, 53.5 per cent. were retarded, and only 12 per cent. ahead; of the 137 pupils whose records were traced through the grades in Princeton, Ill., 69.3 per cent. were behind time, and only 4.6 per cent. accelerated (5, 6); in a Baltimore class, where the progress and retardation was likewise traced for 43 pupils from the first to the eighth grade, 77 per cent. arrived late, while only one arrived ahead of time (12); in three Chicago schools the per cent. retarded was 68.1, the per cent. accelerated 8.1; in Cincinnati (report of 1907: 18) the proportion was 58.4 per cent to 9.6 per cent.; in Mauch Chunk township, Pa., 34.5 per cent. to 16.6 per cent. (for 842 pupils studied. Most of the accelerated started early: 20); in five cities studied the retarded were from 10 to 150 times as numerous, and in 29 other cities from 8 to 10 times as numerous (Ayres). It has been said that three out of every four must do one room twice (Ayres).

In the light of these statistics—and later returns will probably not lessen the ratios—it becomes imperative to undertake a thorough study of the causes, results and treatment of retardation—the great threatening colossus of the modern school. Every retarded child should be given a psycho-clinical examination to determine whether the retardation is a case of genuine arrest or subnormal mental development, or whether it is the result of late entrance, transfer, irregularity of attendance, illness, physical defectiveness, language deficiency, poor teaching, lack of individual tuition, maladapted courses, indifference, etc. Until the cause is known, the treatment cannot be made scientifically pedagogic.

*The Functions of the School's Psycho-clinical Laboratory.*

1. *The clinical examination of exceptional children.* Every child retarded pedagogically two years or over should be tested in the laboratory, or by trained assistants in the schools. The tests should include, as a minimum, the graded serial tests for determining the amount of mental retardation, form-board tests, sensory-motor tests, which have a diagnostic value (auditory and visual acuity, motor skill, hand dynamometry, endurance, body sway); selected standardized tests of fundamental intellectual traits (memory, spontaneous and controlled association, accuracy and quickness of perception and observation, recognition, linguistic construction, learning capacity); certain physical and anthropometric growth measures (sitting and standing height, weight, vital capacity and perhaps tests of anatomical age), and possibly certain reflex action tests. In selected cases the psycho-analytic (Freud) and reaction-association (Jung) tests may be relevant for purposes of diagnosis of more fundamental mental abnormalities. Percentile curves should be plotted for each child, showing his status relative to the normal child of the same chronological age (perhaps also anatomical and psychological) and height (or weight). To plot such curves we stand in need of reliable norms for typical, average or normal children. Since we do not now have fully satisfactory norms, one of the functions of the laboratory at the present time should be:

2. *The establishment of thoroughly reliable norms for normal children.* To be sure, we already have a set of norms for certain functions, namely, those worked out by the Department of Child Study and Pedagogic Investigation of the Chicago schools. These norms are perhaps reliable so far as they go, and have sufficient validity to enable us to proceed at once, without awaiting confirmatory or more elaborate measurements, to measure and grade, with considerable confidence, any given child, whether subnormal, normal or supernormal. Yet the fact remains that one of the most urgent educational needs of the day is the repetition of Smedley's percentile work (an excellent pioneer investigation) on height, weight, vital capacity, manuometry, endurance and other functions on a much

larger scale and under more satisfactory conditions.<sup>1</sup> For Smedley's norms are defective in four respects, at least.

In the first place, they are based upon the examination of too few persons. To secure thoroughly reliable *normal norms* we should examine at least 1000 persons of each sex for each year. Smedley's numbers for a given age ranged from 44 (ages 19 and 20, boys) to 448.

In the second place, we have no evidence that the norms are *normal norms*; i. e., that they are based upon the examination of typical or normal children. In fact, the probability almost amounts to a certainty that a considerable number of the pupils examined were more or less subnormal or abnormal. It is, therefore, evident that a percentile curve for any case of retardation plotted on the basis of these results tends to over-estimate the capacities and ability of the pupil in comparison with the typical child.

Of course, the concept of a normal norm—a typical, normal individual—is quite fluid or elastic. Still we can use two criteria, which are adequate for all practical purposes, by which to select a normal pupil; namely, *school grade* (pedagogical status) and *degree of physical defectiveness*. On the basis of the first standard, the pupils of a given age who satisfactorily carry the work of the school grade to which they belong (or of an earlier grade in case of late entrance), may be considered *mentally* normal.

The other method of selection is based upon the physical and medical examination of the child. That child may be regarded as *physically* normal who does not possess obvious physical defects, or in whom the ravages of infant and childhood diseases have not resulted in pronounced physical impairment. In other words, those

"The task involved in gathering reliable norms, for both children and adults, is herculean, and would require the combined efforts of many workers. The work should be organized by a public or endowed private bureau of research, so that it may be done with sufficient thoroughness, so that uniform or standardized methods may be used, and so that the results may be worked up in the most serviceable form (percentile curves). Properly to study any given individual—normal, criminal, insane, demented, amented—we must have *individual and typical percentile curves*, showing the relation of various traits and capacities at various ages to weight, height and vital capacity.

I know of no form of public service which merits more fully the liberal support of philanthropic persons who have the interests of humano-culture or eugenics at heart. It is a work that should be munificently endowed. One of the essential functions of the Russell Sage Foundation, and the proposed Government Bureau of Child Welfare, might well be the establishment of mental and physical norms of development. Meanwhile, our psycho-clinical school laboratories should contribute their mite toward obtaining these norms for persons of school age.



children would be physically normal who suffer only from the *ordinary* amount of physical defectiveness. Even under the best conditions of modern life, the child with assumed "normal" motor and sensory equipment will show some traces of physical defect (21, 22). It is therefore chiefly important to *exclude all the extreme departures*.

Fortunately, both of these methods of selection are entirely practical, and the norms obtained by them would be invaluable. They would not only give us valuable measures of the mental and physical powers and capacities of people of the present generation—*eugenic indices*—but indices by means of which to determine the character and extent of the changes in human functions which are gradually taking place through hereditary propulsion and environmental influences.

In the third place, Smedley's range of ages, from 4 to 21 (or "21 years and over"), is too limited. It embraces merely the periods of childhood and adolescence. We need norms for the adult or the ebb period of life as far as the age of 40 or 50, at least. Such norms would perhaps have no immediate practical value for the public schools, juvenile courts or correctional and rescue homes for the young, but to the student interested in the scientific study of the problems of human evolution or in the study of the degenerative, involution, senescent changes peculiar to the process of aging, or in the study of the various physical deviations and psychoses peculiar to various classes of defectives (feeble-minded, epileptic, insane, paralytic, etc.), they would possess unusual value. At the present time we have little knowledge that is scientifically accurate regarding growth, developmental or retrogressive changes peculiar to middle and old age, because the norms are practically non-existent.

In the fourth place, Smedley's percentiles are given for whole ages only—4, 5, 6, 7, 8, 9, etc. A child who is 6 years and 1 day old is grouped with one who is 6 years and 364 days old. Consequently, children who are practically one year apart in age may be grouped together. This tends to introduce a considerable error, owing to the kaleidoscopic developmental changes which occur during the growth period. During this period the results which are valid for the youngest child of a given age may grossly misrepresent the oldest child of that age. Accordingly, a better plan would be to group children by

*half-ages*, thus: 4, 4½, 5, 5½, etc. Thus, the 6-year group would include children from 5 years 9 months (beginning of ninth month) to 6 years 2 months (end of second month), while the 6½-year group would include children from 6 years 3 months (beginning of third month) to 6 years 8 months (end of eighth month). In other words, children are grouped under a given age-designation whose age is within three months in either direction of that designation. For the years following the growth period the present grouping by whole ages is probably satisfactory.

It should be emphasized that the norms required are not merely physical and anthropometric, but also psychical.

3. The psycho-clinical laboratory, in the third place, *should serve as a clearing-house* for the exceptional child—a function which it should discharge jointly with the special schools. At the present time the special schools serve this function very inadequately; they have become rather a *dumping ground* for the ne'er-do-wells, the offscourings, of the schools—a place to which they may be relegated indiscriminately in order to relieve the regular rooms of an intolerable incubus. After the backward child, pedagogically retarded two years, has been examined in the laboratory, he should be sent to a special school (one in charge of a teacher specially trained for special-room work), with specific recommendations, for further careful pedagogical observations and various tests. He should be given a well-planned try-out for a while, the results of which should be sent to the laboratory. On the basis of these results—the clinical examination and special-room testing—the director should recommend the transfer to, or the placing of the child in, his proper place—the special school, the school for the blind, deaf, crippled, tuberculous, or in an institution for feeble-minded and epileptic. All pupils (without any special temporary physical disorder) who are mentally retarded more than four years are probably permanently arrested, and are institutional cases. They should be separated from the merely retarded or backward. The recommendations of the director should not be subject to reversal, except through action by the board or the superintendent. As a clearing-house for retarded pupils, the laboratory would render an important service to

the schools not performed by any existing agency. It is evident that to perform this service in the best possible manner the laboratory must have available full data from the other sources which we have already discussed. Where there is no complete bureau of school research, the clinical laboratory would logically assume the functions of such a bureau.

4. The laboratory may also undertake *the training of teachers* in the psycho-clinical methods of testing pupils. At least all the teachers of special classes should have such training. They should be able to give some of the tests in the special schools under the direction of the laboratory. This is desired, because the percentage of retarded children is so large that it would probably be beyond the means of the laboratory to examine all the pupils who should be examined in a large school system. To apply the Binet-Simon tests thoroughly requires from forty-five minutes to an hour. Hence it would seem best to limit the work in the laboratory to the tests which cannot be satisfactorily carried out by the trained special-room teachers. This would, of course, include most of the tests.

5. Finally, another function of the laboratory might be the *supervision of the curricula of the special schools* and the *offering of courses* in the training-school on the psychology and pedagogy of mental deviation or deficiency. It is obvious that to perform all these functions the laboratory would have to be organized on a comprehensive basis.

#### THE QUALIFICATIONS OF THE CLINICAL PSYCHOLOGIST.

It remains to consider, briefly, the qualifications needed by a successful clinical psychologist.

1. He must be temperamentally adapted for the work. I do not know that this is first in importance, but mere knowledge of the methodological technique peculiar to psycho-clinical work does not necessarily make a successful examiner. The examiner must have the ability or knack to *draw out* the best the child has to give; if he is obliged to *force* it out he is lacking in the very essentials of the work. Psycho-clinical examination is not a forcing-out process. The examiner should, through word, action, demeanor and bearing, be able to calm,

pacify, set at ease the nervous, excitable child; and to encourage, incite, stimulate the phlegmatic, timid, taciturn, obstructed child. He must be genial, friendly, sympathetic, quick to praise and slow to criticise, and must be able to win the confidence of all. He must possess an unlimited reserve of patience with the frivolous, resistant and snail-like plodders. He must be versatile and resourceful, so that he can change his attitude and method of attack to suit all types of persons. There are persons who will respond only to pressure, and with whom stern measures will produce the best results. But they are entirely exceptional.

2. It is not enough that he has a thorough grounding in the methods and results of analytical, descriptive, experimental, child, social, physiological and educational psychology; he should have a definite, technical preparation in clinical psychology. He should be conversant with its methods, standpoints, aims and results. Knowledge of structural psychology is not sufficient; the best structural and experimental psychologist may make the sorriest clinical psychologist. Often the paramount need is the ability to tear loose from the abstractions, schematizations and viewpoints of the structuralist. The clinical worker must use the "case" method of procedure; he must be able to individualize each case (a capacity that is likewise needed by the special-class teacher), to study it in the concrete, to frame a clinical picture of it—in a word, to examine clinically. To do this requires more than a mastery of the framework of psychology; it requires ready powers of observation, keenness of insight, power to interpret, ability to notice signs and symptoms, a knowledge of symptomatology and of the best available methods of psycho-clinical diagnosis. At the present time no adequate training is afforded in clinical psychology except through an apprenticeship with one of the few experts in the field.

3. A knowledge of nervous and mental diseases, of psychopathology and psychotherapy, is essential for a clinical psychologist in the medical school; it would be a valuable asset to the examiner of retarded and delinquent children. He will also be much the stronger if he has had practical teaching experience in the public schools, so that he has come directly in

touch with the problems of the training, growth and development of the child mind; if he has taught educational psychology in training-schools for teachers, so that he is alive to the vital educational problems concerning pedagogical methodology (questions regarding methods of studying, learning, instructing, drilling, memorizing, initiative, working efficiency, hours, rests, alternation of subjects, etc.), and so that he may thus turn his investigations to wider pedagogical use; and if he has likewise been in direct touch with classes for retarded pupils and speech-defectives and institutions for defectives, particularly those for the feeble-minded and epileptic, so that he has acquired that developed insight which will enable him to make a preliminary, offhand rating or diagnosis of the child as he stands before him.

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Budapest boasts the first state school for nervous children on the continent. The school was established for the benefit of those children who, owing to physical weakness, nervousness, or limited mental capacity, fail to advance as they should in the regular classes, and it aims to develop healthy and useful individuals for practical life. It provides medical and hygienic treatment under the care of a physician. The pupils are boarders, half-boarders, or day pupils, and range from seven to fifteen years of age. The tuition for boarders is 200 crowns per month, medical attendance extra, and clothes furnished by the parents. Half-boarders pay 100 crowns per month, and the rate for day pupils is 60 crowns. There are no free pupils.

## THE SPELLING OF COLLEGE STUDENTS.<sup>1</sup>

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The arguments urged in favor of spelling reform are many and various. The contention that the adoption of the simpler forms would save time and money now used in the teaching, learning, writing and printing of useless letters is reasonable on the face of it, as anyone may see, tho investigations have not yet been made sufficiently scientific and extensive to enable any one to say just how much time and money could be saved. The argument that the proposed reform would obscure etymology is a matter for philological experts to settle; the opinions of others, however interesting, can be given little weight. The sentimental objection that literature in the simpler spellings would lose some of the feeling and beauty that longer spellings connote is an objection which each person has a right to weigh for himself, since this is a purely personal matter; but obviously he cannot settle the question for his brothers, much less for untold generations to come, which, the reformers assume, would have no established associations with the older forms. The contention that simplified spelling would promote the adoption of English as an international language and thus hasten the time of peace among nations is an argument of some weight, tho here, again, there is no means of measuring its force. The objection that the present campaign of the Simplified Spelling Board cannot succeed may or may not be well founded, but it is clearly extraneous to the question of the merits of the proposed reforms.

On the other hand, the contention that the inability of the graduates of our great public school systems to spell accord-

<sup>1</sup>Simplified spellings are used in this article at the request of the author, in order that readers may see to what extent the use of the shorter forms alters the appearance of the printed page.

ing to conventional standards is due mainly to the fact that English spelling does not correctly represent English speech is an argument which may be tested, if data can be collected and interpreted that is sufficiently extensive and free from exceptional elements. An attempt is here made to present such data.

From the momentous day when the child in the primary school, with infinite pains, first spells out C—A—T, until as a college student he is compelled to rewrite his daily theme because, with all the years of painful drill, he has not succumbed to the conventional spelling of *proceed* and *precede*, the spelling lesson occupies a place in our school systems out of all proportion to its importance and, it would seem, out of all proportion to its achievement. The early grammar grades complain that the primary schools have failed to teach spelling; the upper grammar grades find fault with the lower; the high school protests against the necessity of doing such elementary work; the college is vexed to find that the schools have not instilled due respect for the authority of the big dictionary, and finally the business man derides all higher education because the college graduate in his office does not know how to spell.

Careful tests at several colleges for the past three years show that over 25 per cent. of the students cannot spell such common words as *licorice*, *existence*, *recommend*, *descendant*, *sieve*, *annulled*, *villain*; 50 per cent. failed on *accommodate*, *occurrence*, *stationery*, *referred*, *rhythm*. In 10,000 short themes at Bowdoin College, 2005 errors were noted. A recent report on Entrance Examinations in English at Harvard College, issued by the University publication office, gives further evidence that the best graduates of our public schools do not know how to spell. The fact is, we cannot set up the ability to spell according to conventional standards as a test of literacy without condemning our entire school system. There are those who prefer to condemn the conventional standards.

To determine the causes of errors in spelling, a study has just been completed of 10,000 themes, covering all the work of 300 students at Bowdoin College. The writers represent 140 preparatory schools in 15 different States, and the data was collected by five clerks, who were instructed to make note of



every error, and who had no desire to prove anything in particular by the final results. These results are worth more than dictated spelling lessons, because there is little advantage in knowing how to spell a word unless one wishes to use it in writing; tho this idea no doubt seems heretical to managers of world's expositions and other irresponsible bodies, which have of late revived the old-fashioned spelling bee. Unlike formal spelling lessons, these 10,000 themes approximate the conditions under which men use the written language in daily life, and seem, in other respects, sufficiently typical and extensive to offer a safe basis for generalization.

The following table summarizes the results:

SPELLING ERRORS OF THREE HUNDRED STUDENTS IN TEN THOUSAND THEMES.

Words misspelled, 1961.

Words having two errors each, 44.

Total number of errors, 2005.

*Classified as to apparent causes of error.*

Carelessness.....	467
Mispronunciation.....	259
Insertion of silent letters { 853 }	388
Omission of silent letters { }	465
Order of <i>ie</i> and <i>ei</i> .....	31
Confusion of <i>-al</i> and <i>-le</i> .....	33
Confusion of <i>-ent</i> and <i>-ant</i> .....	24
Confusion of <i>-se</i> , <i>-ce</i> , <i>-ze</i> .....	44
Confusion of <i>-able</i> , <i>-ible</i> , <i>-ance</i> , <i>-ence</i> .....	28
Spelling <i>-er</i> sound as pronounced.....	167
Due to all other causes, including doubtful cases.....	99
Total.....	2005

Of the 2005 errors, 467, or 23 per cent., were due to carelessness. When a student of higher mathematics allows two plus four to make seven, the error cannot be charged to ignorance of fundamental operations. No more can such spellings as *intelgent*, *crunb*, *an* (for *and*) be charged to ignorance of conventional spelling. In tracing the causes of inability to spell, therefore, these 467 mistakes must be ignored.

Of the remaining errors, 259 were apparently due to mispronunciation. The students carefully speld *atheletics*, *government*, *suprise*, *seperate*, *dormatory*, *devine*, *quandry* as they spoke these words, but they were faithful to unapproved pro-

nunciations. The present widespred recognition among schools of the need of securing clear, accurate spoken English, with painstaking enunciation, will diminish the number of spelling errors due to faulty speech, increase the proportion of errors due to other causes and thus render even more conspicuous the present discrepancy between our correct symbols and our correct speech.

That greater care in matters of pronunciation will *greatly* reduce the difficulties in spelling is, however, a vain expectation, for in the present chaotic condition of our spelling a person who is sure of the correct sound has still to ask how far the accepted symbols may fail to represent the sound. And the ready ability to answer this question demands a life-long drill of the most wasteful kind known to education.

The largest class of errors in spelling consists of 465 words from which silent letters were omitted. Such spellings as *begining* (found 26 times), *necesary*, *condem*, *thot*, *releas*, *mision*, *knoledge* are in the direction of phonetic spelling; that is to say, they come nearer to representing our speech than the approved forms, and find abundant analogies among the approved forms of other words. From the standpoint of an ideal language, most of these 465 incorrect forms were preferable to the correct forms.

The opposit error is the insertion of silent letters. Among the 388 members of this class, the following are typical: *Amoung*, *deffinition*, *occassion*, *charachter*, *proffession*, *harmfull*, *schould*, *comming*. Nearly all of the errors in this group come about apparently thru the more or less conscious effort of the student to spell according to analogies with approved spellings that are precisely as irrational and wasteful. But in English spelling, as a general rule, he who reasons is lost. These two classes of errors—those due to the omission of silent letters in the direction of an ideal system, and those due to the insertion of silent letters thru analogies with correct forms—comprise 853, or 55 per cent., of the total real errors in spelling. The remaining errors, as the table shows, were for the most part due to the confusion of various endings that are pronounced alike but speld differently.

Among the various conclusions that may be drawn from

this investigation, one tends to support the contentions of those who hold that the reforms thus far proposed by the Simplified Spelling Board would not accomplish all that is sometimes claimed by those unacquainted with the movement; for it may be noted that only 155 of the 2005 misspellings occur in words contained in the lists first recommended by the Board. On the other hand is the highly significant fact that 76 per cent. of the errors in spelling were clearly due to the chaotic condition of a language in which correct spelling fails to represent correct speech. So far, therefore, as this study may be regarded as a safe basis for generalization, it proves that the majority of the difficulties that confront the fittest intellects among grown-up spellers, because of which they must be dubbed illiterate, according to conventional standards, in spite of long years of school drill—the majority of these troubles, it is clear, would disappear with a conservativ extension of the principles of simplification advocated by the Simplified Spelling Board.

Speaking in the French Chamber of Deputies, M. Maurice Steeg, one of Deputies for Paris, and reporter for the estimates of the Ministry of Public Instruction, outlined the educational program of the Republican majority. "The claim of the state to control education," he observed, "is calculated to deliver the rising generation from the tendency to conduct education in the interest of particular parties. The great problem of the present day is to reconcile the traditions of the universities and the cult of the humanities with the growth of the scientific spirit. It is noticeable that the bourgeois elements, which until recently have practically monopolized the secondary schools, are now attracted toward commercial and industrial careers, for which the curriculum of the secondary schools makes no adequate provision; while the classes which have hitherto contented themselves with the elementary course for their children are now demanding opportunities for a more liberal education. Satisfaction in both these directions ought to be accorded."—*New York Evening Post*.

## COMMUNICATIONS AND DISCUSSIONS.

### THE MEETINGS AT MOBILE, ALABAMA, FEBRUARY 22-25, 1911.

In so far as attendance was concerned, the Mobile meeting of the Department of Superintendence and affiliated organizations did not turn out so unfortunately as was anticipated. There was a good representation from all sections of the country, and naturally a much larger attendance from the South than is usual at these mid-winter meetings.

The general program was not a great success. The introductory addresses of welcome were thoroughly enjoyable, for the arts of rhetoric and oratory are highly cultivated in the South, and an initial opening of the flood gates of the English language should tend to relieve the pressure and permit the more important business of a convention to keep itself below the clouds and close to its own matter-of-fact problems. Probably the most significant and valuable feature of the program was Professor G. D. Strayer's presentation of the forms that he has devised for the collection of educational statistics in the Bureau of Education. Professor Strayer has worked long and patiently on this problem, and his proposed schedules will enable the reports of the commissioner to reflect much more faithfully than they ever have before the actual educational situation.

The National Society of College Teachers of Education met at the Battle House on Thursday noon for the annual luncheon. The conditions were such that the addresses usually given on this occasion had to be omitted. The Society adjourned for a short business session in the afternoon, but the attendance was very small. The general topic of the meeting was "Research within the Field of Education: Its Organization and Encouragement." The year-book contained papers by E. P. Cubberley, W. F. Dearborn, Paul Monroe, E. L. Thorndike, B. T. Baldwin, H. E. Bennett, W. W. Charters, E. O. Elliott, H. H. Foster, J. W. Hall, Paul Hanus, C. M. McConn, M. V. O'Shea, W. S. Sutton and G. M. Whipple. A detailed review

of these papers will be presented in a later number of the *JOURNAL*. At the first meeting Monroe and Dearborn summarized their papers, but a full discussion was prevented by an adjournment of the society on account of other meetings which the members desired to attend.

The principal matter of interest in Friday's meeting was the election of officers. The nominating committee brought in a report proposing for president a member who was not present at the meeting. The society rejected the report, and elected Professor M. V. O'Shea president for the ensuing year.

The National Society for the Study of Education published, as usual, a year book in two parts, one dealing with the city school as a community center, the other with the rural school as a community center. Among the contributors were H. C. Leipziger, Mrs. Sarah E. Hyre, R. D. Warren, C. W. Crampton, E. W. Stitt, E. J. Ward, Mrs. E. C. Grice and C. A. Perry on community work in the city; and B. H. Crocheron, Miss Jessie Field, F. W. Howe, E. C. Bishop, A. B. Graham, O. J. Kern, M. T. Scudder and B. M. Davis on the rural community. These papers form a valuable summary of the more important "experiments" that are being undertaken in various parts of the country to make the school plant of the greatest possible service to the community which supports it. This is a sociological movement of vast significance, and it is opening out a vista of possibilities hitherto undreamed of. It means extending education far beyond the limits of school age; it means sending the entire community to school. These possibilities and the various means by which they are being realized are so fascinating that one sometimes turns back to the routine work of the classroom with a feeling that the tasks which it imposes are prosaic and, if not unimportant, at least of very minor significance in the light of these new ventures. This is a danger that inheres in much of our reform work in education.

Superintendent Carroll of Rochester made an ideal presiding officer. Here as in the College Teachers' Society, however, the innumerable distractions prevented concentrated discussions. If the meetings of these societies are to be productive of worthy results, they should be held before the general sessions of the Department of Superintendence begin. There is a place for something that is thoroughgoing and fundamental in the work of both organizations. An important step has been made in printing the principal contribu-

tions beforehand, and in thus eliminating the tendency to prepare papers that will simply make a good impression when read. On the other hand, purely extemporaneous discussion encourages loose thinking and discourages concentration upon a few dominant topics. In the reaction against the "set" papers, we have gone to the other extreme, and the result is very far from satisfactory. And in the present emphasis upon reports of actual conditions and real progress, there is also a minimizing of the importance of interpretation. To determine the meaning and significance of the data presented is, after all, the important problem. In this connection it should be noted that the year books of both societies came from the press too late to reach a majority of the members prior to the meetings.

There seemed to be a general feeling at Mobile that two organizations so closely related, both in function and membership, as the Society of College Teachers of Education and the National Society for the Study of Education, should not continue to occupy the field as competitors, but that some form of co-operation should be instituted. It is to be hoped that these two societies, while preserving each its own organization, may come to concentrate upon common problems, and hold at least one joint session.

W. C. B.

## ABSTRACTS AND REVIEWS.

EDWARD BRADFORD TITCHENER. *A Text-book of Psychology*. New York: The Macmillan Company, 1910. Pp. xx, 565. \$2 net.

Since the work of the educationist has to do primarily with the adjustment of behavior to the demands of the social environment, it is not surprising that the functional psychologists are the ones that have become most closely identified with education. At the present time, however, evidences are not lacking that the presentations of the functional psychologists are less satisfactory for educationists than their attractive program seemed to promise. There is a vagueness, an elusive indefiniteness, about the functionalist's position on many psychological questions that is very baffling and disquieting. We shall not be surprised, therefore, to find this work of an avowed structuralist, of one whose chief interest it is to unravel one by one the tortuous threads in the intricate pattern of consciousness, to analyze the complicated thought structure into its elements, and to present a sharp and definite picture of the nature of mental processes, received with favor by the many educators who are not psychologists themselves, but who desire to know in detail what modern experimental psychology has accomplished.

In the present volume we have a concise, straightforward, unequivocal statement of the facts of experimental psychology, and of such generalizations as these facts seem to warrant. It was not many years ago that philosophers and scientists were prone to raise the question whether a genuine science of consciousness was possible. If anyone has such a doubt today, this volume should convince him that not only is such a science possible, but that it is already firmly established. We find recorded here a body of definite and experimentally verified fact, which unquestionably entitles psychology to a place in the galaxy of science beside her elder sisters, physics and chemistry. If one wants to know the facts of psychology, if one desires a simple, lucid, adequate portrayal of those facts, this is the book which should be consulted.

It is true that the educationist is not apt to be particularly interested in the description of the sensory and affective elements of con-

sciousness, although it is upon these elements that all modification of conscious behavior is based. In view of the great activity of experimentalists in this field, however, and of the mass of material that has been accumulated by them in the past thirty years, it is not surprising that over 260 pages of the book are devoted to these topics.

A subject more vitally connected with the educator's activities is attention, and here the work of the experimentalist has been revolutionary. It has been said that experimental psychology discovered attention. At any rate it has effectually disposed of the conception of a permanent, transcendent mind which turns our activities now in one direction, now in another. Attention is clearness in consciousness. It is a matter for congratulation that the author rejects the traditional, twofold classification of active, or voluntary, and passive, or involuntary. Attention is one, it is single. In its development it shows three stages, which are of the greatest importance for the educator. Primary attention is that in which impressions or ideas "take consciousness by storm," dominate the whole mental stage, and for the time allow nothing else to enter. This is the fundamental form of attention, and is genetically the earliest. But we are assailed by many stimuli at once, and previous experiences, leaving their trace, complicate present situations. These conditions give rise to a conflict of primary attentions, "there are rival claimants for the chief place in consciousness, and the standing room is limited," there is division or oscillation of attention, and we are conscious of mental effort. This the author calls secondary attention, since it is an outgrowth of the primary. The object in the focus of consciousness has to hold its ground against one or more assailants. But impressions and ideas are more or less alike; they give rise to the same sort of conscious response, and with repeated domination in consciousness a habit is established which makes it easier for a given sort of object to hold the field against all comers—as, for example, in the prolonged study of a science. This is called derived primary attention. Thus, through the complexity of experience we have secondary attention continually developing out of **primary attention, and through repetition and habit formation secondary attention is continually sinking back into derived primary attention.** The application of this to the study of arithmetic or reading is obvious, and points the way to a genuine explanatory psychology of school activities. Indeed, the whole chapter on atten-



tion is written largely from the educational point of view, and will amply repay careful perusal by the teacher.

In the discussion of association, the traditional "laws of association" are reduced to the following descriptive formula: "Whenever a sensory or imaginal process occurs in consciousness, there are likely to appear with it (of course, in imaginal terms) all those sensory and imaginal processes which occurred together with it in any earlier conscious present." Thus, all associations, whether of so-called contiguity, similarity, contrast, or cause and effect, are referred to "togetherness" in experience, and ultimately to "togetherness" in the attendant neural conditions. The value for the educationist of this emphasis of "togetherness" needs no extended discussion.

The chapter on memory and imagination is full of interesting details and valuable generalizations from the rich experimental literature of the subject,—a literature that has grown at a tremendous rate during the past decade. Perhaps the most striking topic in the chapter is the discussion of the memory image and the image of the imagination. Popular psychology considers the memory image as something fixed, stable, unalterable, a copy of the original experience, while the images of imagination are said to be notoriously fleeting, evanescent and unreliable. Experiment shows that precisely the opposite is true. It is the memory image that shifts and varies according to conditions, while the image of the imagination, relatively isolated from changing perceptual conditions, and depending solely upon its ideational setting, is held stable and constant. Important pedagogical maxims may be drawn from this discovery. Sheer memory work in school subjects is destined to be fleeting and unstable. Only in so far as the presented subject matter is melted down and recast in the mould of the pupil's imagination will it have permanent and lasting value. Hence the objective of the teacher should be the training of the imagination, rather than the short-sighted emphasis on memoriter reproduction, which characterizes so much of the actual school work at the present time.

Starting with a brief history of the simple reaction experiment, the author discusses simple and compound reactions, the general characteristics of action, devotes eight pages to an interesting treatment of the genesis of action, and concludes the chapter with a classification of action. The view of Wundt and Ward is adopted, that reflexes are the mechanized results of original conscious ac-

tions,—a view which would require a much fuller discussion than it here receives to make it plausible to the writer.

The chapter on emotion gives a full and appreciative statement of the James-Lange theory, makes a critical examination of its claims, and finally denies its central thesis that emotion consists of the sensations of organic reactions. The concluding chapter on thought presents an excellent résumé of recent experiments on the higher thought processes.

The simple, direct, unaffected style of the book, the deft touches of humor that flash forth now and then, and the intimate, personal tone of address, combine to hold the interest at a high level, and, for a text-book in psychology, make the work exceedingly entertaining.

J. C. B.

*J. B. Basedow's Elementarwerk, mit den Kupfertafeln Chodowiecki's u. a.* Herausgegeben von Theodor Fritsch. Leipzig: Ernst Wiegandt Verlagsbuchhandlung, 1909. Imported by G. E. Stechert & Co., New York. 3 Bände. Bd. I, S. 543; Bd. II, S. 576; Bd. III, S. 35 und 96 Kupfertafeln. Halbpergament, Mark 28.

Some two or three years ago the writer found in an old book store in Germany a large number of unbound copies of the first editions of a number of works by Basedow, the great leader of the philanthropinist movement of the last half of the eighteenth century. These volumes had never reached the book market from the hands of the printer. Considering the large number of works which came from the pen of Basedow—he is credited with over 90 separate publications—and the very great number of copies printed of many of these, it would hardly seem that a reprint of any of them was necessary. Yet the most influential and elaborate of these, the *Elementarwerk*, published in its full form in 1774, while still readily attainable through the old book trade, has been recently republished practically in facsimile. The historic importance, the scarcity of the volume of illustrations, and the intrinsic merits of this work for the present generation of teachers, justifies this enterprise which could hardly be paralleled by American or English educational publishers.

The *Elementarwerk* occupies a unique position in the history of education, for it summed up as no other book ever did the fruits of educational thought of the century which preceded its appearance

and marked the beginning of a new era in the treatment of the child. . On the one side is to be noted the influence of Comenius in two directions. The more obvious, of course, is the use of pictures to objectify the studies of the schoolroom, a principle which led Basedow to decorate the school walls from ceiling to floor, and too frequently led him to neglect the direct and first hand concrete illustration for the picture, so that the picture often appears to be an end rather than a means to information. The other outcome of Comenius' work is to be found in the pansophic content of the *Elementarwerk*. Nothing, apparently, is to be avoided in instructing children up to sixteen years of age, no information that touches themselves, their relations to their fellows, to God, to the world of nature is to be withheld. From this point of view the *Elementarwerk* is encyclopedic, a compendium of all human knowledge. It is interesting to notice how Basedow takes over the educational ideals of Locke particularly on the physical and manual side. Like Locke Basedow strongly recommends the hardening of the child, who must be accustomed to endure heat and cold, to stand in a draught while perspiring, eat coarse peasant fare, to do without sleep, or to sleep on hard benches, and to be exposed to all kinds of dangers and difficulties. Although Basedow writes ostensibly for the better classes, he recommends with Locke that their boys should receive a thorough preparation on manual labor, should become acquainted with the work of the carpenter and mechanic, of the peasant and small farmer, of the miner, sailor, merchant, etc., so that they should not be ignorant of the activities and occupations going on around them. The influence of his contemporary, Rousseau, is hardly so well marked as is sometimes claimed, except perhaps through the general movement in which a study of nature was considered worth while. On the disciplinary side Basedow stands in strong opposition to Rousseau; commands and advice play an important part in the training of the young child in the work of Basedow, who held that the appeal to reason in the early years was not a solid foundation for obedience and moral training. To the general influence around him—the influence of the *Aufklärung*—Basedow responds by a strong appeal for religious toleration and non-sectarian education.

The *Elementarwerk* and the *Methodenbuch*—the two must be taken together—contain Basedow's child psychology. However elementary this may be, it is at any rate an attempt in the right direction. The division of the life of the child is broad and sweeping, but is

an improvement on the view which regarded the child as a miniature adult. Yet in spite of this psychological insight into child nature, it cannot be claimed for Basedow that the *Elementarwerk* successfully bears out his views. Except for the earlier books the arrangement is wholly unsystematic and information is piled up too frequently without regard to sequence. How far the work when completed failed to carry out the ideas which the author had in mind when he wrote his "Appeal" (*Vorstellungen*) may be seen by a comparison of the principles laid down in the earlier work with the arrangement of the later. He intended to (1) begin with the earliest knowledge of the child, (2) to teach each subject at the right time for the education of heart and hand, (3) to follow nature without missing any stages of development. As a matter of fact the *Elementarwerk* is rather an encyclopedic handbook for teachers and parents who are expected to rearrange the book in accordance with the principles just given and those contained in Basedow's own *Methodenbuch*. The pictures which accompany the work are employed throughout to give concrete background and in many cases an appeal is made to the illustrations which could better have been made to the actual concrete objects, and in many instances Basedow would read so much into the pictures that the imagination is strongly exercised.

Perhaps the most interesting part of the whole work is the first book, which deals with the "Beginnings of elementary instruction." The education of the child begins almost from birth, for even the suckling babe is affected by the demeanor of those around him; hence everything that the child perceives must be orderly and purposeful. He should be surrounded by educative experiences. Thus older children are to play games, such as the alphabet game, in his presence to incite him to imitation. The older children (*Vorgänger*) play an important part in the early instruction of a child, since Basedow relies so much on imitation in the early years. Basedow even recommends the making of mistakes by the older children, merely that they should be corrected in the learner's presence. In language teaching, Basedow insists that a knowledge of things shall go with a knowledge of words (*Sacherkenntniss mit Spracherkenntniss*). There is an interesting section on the teaching of names and qualities by association and contrast, a method, however, which would find little favor nowadays. But at no stage practically throughout the book does Basedow mention the age of the child

under instruction at any given stage, beyond saying that childhood extends to the age of ten, and "first youth" to sixteen and "second youth" to twenty. Great importance is attached to games, as much for their socializing experiences as for exercise. Basedow gives a fairly comprehensive number of such games, including one in which different occupations are imitated. The last type is carried over into actuality at a later stage, so that the future leader may be acquainted with all types of vocational life. Throughout the whole work there runs a strong moral purpose and almost every lesson is made to subserve a moral end. The second book deals with "Miscellaneous subjects, especially of man and the soul." In this section a full account is given of the human anatomy, of physiology and psychology—an ambitious program for what purports to be an elementary curriculum. In this book is contained an attempt to introduce instruction in sexual matters, which was taken up by other philanthropinist teachers only to be shelved, until its importance is again recognized at the present time. Basedow makes a good defense for inserting the subject, although his presentation is somewhat crude. In psychology the child is to be taught about reason, will and the instincts. From this book we pass to the third book on "Popular Logic," and the fourth book on "Religion." The latter gives an account of the common basis of all religions, the relations of man to the divine Being, and the different religions of the world. The fifth book deals with "Moral Instruction." It opens with a long list of proverbs and moral stories in verse and prose, and this is followed by a list of the virtues, duties and rights of man, laws for public preservation, contracts and deception, patriotism and memorial verses summing up the whole book. The last five books are compilations on the occupations and classes of men (Bk. 6); elements of history, including geography, universal history, mythology and fables, and heraldry (Bk. 7); nature study (Bks. 8 and 9); and the most important parts of grammar and style (Bk. 10). These books may be consulted for the most varied kinds of information. Thus the book on the occupations of men has a section on the art of riding, dancing and fencing; on deception in trade; on the seasons; the elements of history contains sections on sociology and political science, and an attack on the teaching of mythology and fables to children, because they do not contribute to the formation of sound reason; the book on nature study includes sections on tools and implements, on ships and windmills, and architecture.

No doubt Basedow was capable of presenting a better and more logical arrangement, but ill health and the pressure of the subscribers are responsible for the later parts of the work in their present form.

The justification for this elaborate reprint is a renewed interest in the great and influential works in education, and a growing appreciation of the importance of the period in the history of education, and of Basedow as a reformer. This renewal of interest and appreciation is certainly worthily evidenced by such a publication. It is a fine piece of book work, respecting a scholar, indicating an appreciation worthy of commendation.

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WILHELM OSTWALD. *Grosse Männer*. (Leipzig: Akademische Verlagsgesellschaft, 1910. 2d edition. Pp. x, 424. M. 14. Geb., M. 15.)

Roused by the question of one of his Japanese students: "May future great men be recognized in their youth?" Ostwald answers that "one may recognize specially gifted scholars, because they are not satisfied with what the regular course of instruction offers them" (p. 3). He delivers a bitter arraignment of the German school system. Not only is the curriculum severely criticised, but the period now devoted to schooling is denounced as much too long (p. 359). The notion that "with the school no experiment dare be attempted" must give way to the immediate reform that is needed. Those who are competent to determine the nature and content of school instruction are not the philologists, but professors of medicine and of the natural sciences, high military officials and other persons of marked achievement (p. 355).

Precocity is an indication of future genius. Parents and teachers must consider well the nurture of such children, for "not seldom today are the 'heroes of thought' forcibly prevented from following their heart's desire" (p. 340).

Approximately two-thirds of the book is devoted to biographies of six famous men of science—Davy, Gerhardt, Liebig, Faraday, Helmholtz and Mayer. The careers of these men are scanned to determine the biological conditions for the rise of genius. On the basis of the popular psychology, which seeks to comprehend the individual as a "characteristic whole" (p. 9), and of the "conceptions

which he has gained, though doubtless very imperfectly, from his knowledge of men," Ostwald divides thinkers into two groups, which he calls Classicists and Romanticists. This division is based upon the relative rapidity of mental reactions (*Reaktion-geschwindigkeit des Geistes*) (p. 371). The Romanticist is quick to think and to act; the Classicist is slow to think and to act. Of the men named above, the last three are Classicists. Since, Ostwald believes, great men comprehend the problems of their life work in their youth and develop them subsequently (p. 374), the quick-thinking Romanticist can develop a far greater number of the basic principles of his life work than can the more deliberate Classicist, whose motto is "*Pauci sed matura*" (p. 384).

There are many discussions full of interest—the different abilities of Romanticist and Classicist as teachers (p. 375); the race and nationality of distinguished men (p. 330); the bothersome question as to what shall be done with men of science grown old (p. 409). Finally, he speaks of women and their place in science (p. 409); points out several reasons for their lack of achievement, and declares that, although there has been but one woman of the first rank in science—Madame Curie—"we men will gladly open the paths of intellectual activity to our wives, our sisters and our daughters in so far as their own impulses constrain them to pursue them."

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## NOTES AND NEWS.

**AUTHORS' ABSTRACTS.**—At the last meeting of the American Psychological Association a committee on periodicals was instructed to consider ways and means for the encouragement of systematic publication of "authors' abstracts." It was pointed out that many so-called reviews of articles are only summaries, and are often very inadequate and belated. It was suggested that the psychological periodicals should encourage authors of monographs and technical articles to send authors' abstracts to some journal at the time the original material is scheduled to appear. This would guarantee correct and early information about a contribution. Even more helpful than this is the author's "preliminary abstract" of a paper, which, for some reason or other, may not be ready for publication for some time, and yet may contain information which is worthy of announcement. Then, again, there are many articles, *e. g.*, master's theses, which involve original work, but which are not sufficiently complete to warrant publication, yet of which a paragraph or page abstract would be a worthy announcement and a serviceable guide to those who are interested in the subject. The editors of this JOURNAL would, therefore, encourage authors of monographs and research articles within the field of educational psychology to co-operate with them in thus securing correct and timely information about current contributions to educational psychology through the columns of this JOURNAL. If a similar attitude were taken by journals in the other fields of psychology, the review work which is now such an important part of periodical literature would be greatly strengthened.

C. E. S.

**TEACHING-EXPERIMENTS IN PSYCHOLOGY.** In accordance with the recommendation made in the Report of the Committee on the Teaching of Psychology, at the Cambridge meeting of the American Psychological Association, a resolution was introduced at the recent Minneapolis meeting establishing a Committee on Teaching-Experiments in Psychology. President Seashore has named as members of the new committee: Professors G. M. Whipple, J. R. Angell, E. L.



Thorndike, R. M. Yerkes and Margaret Washburn. The chairman, Professor Whipple, urges all teachers of psychology who have worked out successful class-experiments, or who would be willing to co-operate with the committee by trying out such experiments as may be proposed, to communicate with the committee without waiting for personal solicitation. For the two types of experiments under consideration, see the report of the first-named committee, p. 68 and p. 91. A further discussion is reported by Bingham (this JOURNAL, May, 1910, 287).

EXPERIMENTAL SCHOOLS. We learn from the *Zeitschrift für Experimentelle Pädagogik* that the city of Munich has established an "experimental school," in which disputed questions regarding methods of presenting the various school subjects may be put to the test. Such a movement is to be warmly commended to our larger American school systems. Professor Binet, in his recent book, *Les idées modernes des enfants*, pleading for experimental studies of school activities by school authorities, urges them "to remember that instead of being so preoccupied with material science, with material prosperity, with material industry, it is just as important, perhaps more important, to devote their attention to the proper direction and organization of mental energy; for it is mental energy that rules the world." In the present issue Dr. Wallin makes a number of valuable suggestions for the organization of school investigations. But in this country we already have a large number of institutions, more or less closely connected with school systems, which ought to be, and could easily be made, veritable laboratories for educational research. These are the state and city normal and training schools, with their attached practice schools. At present, valuable opportunities for experimental study in these schools are going to waste, and we conceive it to be one of the functions of this JOURNAL to endeavor to arouse a demand on the part of the public for the better utilization of these opportunities.

J. C. B.

ORTHOGENICS. The child-study movement, which has undoubtedly been the most significant movement in the country in recent years, is now growing out into a number of specialized and eminently practical movements. One of these is destined to be designated by the rather formidable name of "orthogenics." On November 15,

1908, Professor Witmer added the sub-title, "*A Journal of Orthogenics*" to the title of *The Psychological Clinic*, and later defined the new term as "the name of a science which concerns itself with the restoration of those who are retarded or degenerate to a condition where normal development becomes a possibility" (*The Psychological Clinic*, III, 2). Professor Witmer now writes that he would prefer to define it as "the science of normal development." We are inclined to favor the original definition because in that sense the term orthogenics gains a specific significance which is not covered by any other word. If used in the latter sense it would lose its original significance and would be too general. We need a term to designate the science and art of "righting," in the process of development, these children who are not normal, including both the sub-normal and the super-normal; and the word orthogenics, though unwieldy, seems to be the best word for the purpose.

C. E. S.

In addition to the experimental school mentioned above, there has recently been established in Munich, under the auspices of the Munich Teachers' Association, an Institute for Pedagogical Psychology for the psycho-pedagogical development of teachers in service, as well as for teachers on leave of absence for the purpose of pursuing higher studies. Courses are offered in educational psychology, pedagogical theory and systems of pedagogy, child anthropology, school hygiene and special methods in school subjects. It has an experimental or practice school attached. The founding of the institute is due chiefly to the efforts of Dr. A. Fischer, of the University of Munich, one of the assistant editors of the *Zeitschrift für Pädagogische Psychologie und Experimentelle Pädagogik*, and the founders hope for an ultimate expansion into a public Academy of Pedagogy and its auxiliary sciences.

The German Association for Mother Welfare has issued a stirring appeal to the ministers of education of the allied states of the German Empire for a more systematic education of the youth in matters of sex. The craven policy of silence, evasion and lying, characteristic of most parents and many teachers, is roundly condemned. It is not only cowardly, but futile, since nothing is really kept from the children, but the worst aspects of sex are known and discussed in secret and in a vulgar manner. Such an attitude toward sex

questions gives rise to the most pernicious practices, and constitutes a grave danger to the biological efficiency of the race. We must and shall have a new education. The teacher, not the vile associate or the vulgar book, must lead children to the source of life. To turn this duty over to parents is merely to shirk a vital responsibility, for parents will never be able to meet the situation so long as the school fails them as completely as it now does. Every one knows that not ten parents in a hundred are equal to the delicate task. Therefore, the Association urgently petitions for the appointment of a commission of teachers, physicians and parents, which shall make such practical suggestions for the education of children in sex matters as may be incorporated in the course of instruction in natural science.

The New York City Board of Education, in its system of free public evening lectures throughout the city, has inaugurated a series of talks on "Phases of Education." The speakers include many college presidents and educators who are in a position to give first-hand information on educational problems. Among the speakers announced are Dr. David Snedden, State School Commissioner for Massachusetts; Dean Thomas M. Balliet of New York University, President Marion L. Burton of Smith College, President George Harris of Amherst, President Rush Rhees of Rochester, and President Charles F. Thwing of Western Reserve University.

A bill looking to state-wide medical inspection of all children in the public schools has been introduced into both houses of the legislature at Nashville, Tenn. The text of the measure, which is based, with some modifications, on the Gulick-Ayres bill, seems sane and reasonable, and we trust the endorsement of the State Board of Health and of prominent educators in the State will be sufficient recommendation to secure its passage.

In accordance with a resolution adopted at the Boston meeting of the National Educational Association there has been appointed a Committee on the Conservation of Vision, which is to investigate the entire subject of the conservation of the eye-sight of school pupils in the United States. The topics for investigation are (1) the extent to which defective vision exists, and to what extent this is due to preventable causes; (2) the means used to detect, prevent

and improve such defects; (3) the character of illumination, both natural and artificial; (4) the relation of the character of printed matter, paper, pencils, etc., to the hygienic use of the eyes; (5) the effect of eye-strain upon the general physical and mental condition of the pupils. Information regarding first-hand investigations along any of these lines would be greatly appreciated by the secretary of the committee, Miss Ida B. Hiltz, Room 206, Metropolitan Tower, New York City.

The current number (V, 6) of the *Journal of Abnormal Psychology* is devoted to articles on psycho-analysis, principally the problem of dream interpretation.

The *Journal of Experimental Medicine* will be issued monthly instead of bimonthly, as heretofore. This will mean the publication of two volumes a year, each containing about 600 pages, but the subscription price will remain unchanged at \$5.00.

The program for the second annual meeting of the New York State Teachers of Educational Psychology, which will be held at Teachers College, Columbia University, April 20-22, includes a dinner at the Faculty Club, followed by an informal meeting at Teachers College on Thursday evening, and regular meetings Friday afternoon and Saturday morning, while arrangements have been made for visitation in various normal and training institutions on Friday morning. The papers thus far promised are, for Friday afternoon: Robert MacDougall, New York University, "The Psychological Basis of Primary Method;" C. B. Robertson, Cortland Normal School, "A Study of Dental Hygiene in Its Relation to School Progress;" E. N. Henderson, Adelphi College, "The Question of Motive in Learning;" Paul R. Radosavljevich, "Reports on Research Work in Experimental Pedagogy at New York University;" R. S. Woodworth, Columbia University, "The Supposed Value of Imagery Tests of School Children." For Saturday morning: C. B. Robertson, "The Status and Problem of Laboratory Psychology in Our Normal Schools;" J. C. Bell, Brooklyn Training School, "Some Experiments That Have Proved Profitable in Teaching Psychology in a Training School for Teachers;" G. M. Whipple, Cornell University, "Some Class Experiments as Used in a Course in Educational Psychology."

The article on Psycho-Analysis and Education, by Dr. Ernest Jones, which appeared in the November number of this JOURNAL, and in which important questions in sex education were discussed, has been reprinted with the permission of the author and the publishers in *School Hygiene* (London).

It is announced that Professor Hans Meyer has presented 150,000 marks to the University of Leipzig for the laboratory of experimental psychology established by Professor Wilhelm Wundt.—*Science*.

The death is reported of W. A. Nagel, Professor of Psychology at Rostock. Nagel is known to investigators in educational psychology particularly for his extensive and important contributions to the theory of color-blindness. His test-cards and his transmitted-light apparatus for examining color vision are radical improvements over the older forms of color test, and have enabled us to differentiate variant types of color deficiency, especially of color-weakness, that are both theoretically and practically significant.

The convocation address at the seventy-eighth convocation exercises of the University of Chicago, March 21, was delivered by Professor Charles Hubbard Judd, director of the School of Education.

At the Mobile meeting of the National Society for the Study of Education, Professor W. C. Bagley was elected president for the ensuing year.

The subject of the Sigma Xi lecture, recently delivered by Professor E. B. Titchener of Cornell University, at the Universities of Minnesota, Kansas, Nebraska and Iowa, was "Types of Minds."

Professor G. M. Whipple will give two courses at the 1911 summer session of Columbia University, one upon Mental Development, open to seniors and graduates; one upon Psychological and Educational Measurements, with special reference to mental tests, and open only to graduates. Professor E. A. Kirkpatrick of the Fitchburg Normal School, who replaces Professor Whipple at the Cornell University summer school, will offer there a course in educational psychology and a course upon methods of teaching in elementary school work.

## CURRENT PERIODICALS.

(In this section only such articles will be noticed as bear directly or indirectly upon the interests of this Journal.)

L'EDUCATION. Second year, No. 1. March, 1910. P. GAULTIER. *The Formation of the Will*. 1-45. A general discussion of character building, and the duties of the school. The author shows how the will develops out of instincts, modified into habits under the conditions of the environment. It is the province of the educator to so control the environment that desirable habits of reaction may be developed. To this end initiative should be cultivated, but obedience should be enforced, and corporal punishment should be used to insure correct habits of obedience. LUCIE BÉRILLON. *Making Education Attractive*. 46-61. The tone of this article is almost the opposite of the preceding stern and rigorous preachment, and might be open to the charge of "soft pedagogy." The fundamental motive of work is pleasure. Therefore, let us strive to make the work of the school as pleasant as possible. Emphasis is laid on the satisfaction gained from unimpeded instinctive activities, and the attractiveness of manual occupations in education is strongly presented. B. BOURDON. *The Study of the Senses of School Children*. 62-83. The eminent psychologist discusses various sensory tests that could profitably be made on school children. Among those mentioned are auditory acuity, limits of pitch, pitch discrimination, auditory localization, visual acuity, astigmatism, perception of light and color, color blindness, comparison of visual magnitudes, stereoscopic acuity, gustatory threshold, olfactory threshold, thermal threshold, tactile threshold, tactile acuity, cutaneous sensibility for movement, for size and for position, and stereognostic discrimination. PAUL GALLOIS. *Reforms of Secondary Education and Parents' Associations*. 84-93. The author accuses the French government of too great autocracy in the control of the schools. Programs are made and the work of the schools regulated to the minutest detail, without the slightest regard for the wishes of either parents or teachers. The result is rigidity and lack of adaptability to conditions. A plan adapted from American secondary school practice is urged. No. 2. June, 1910. L. DUGAS. *Character and Habit: Politeness*. 153-161. An analysis of the psychological and social bases of politeness, and the responsibility of education in this respect. F. MENTRÉ. *The Educative Value of the Lives of Great Men*. 162-173. A forceful appeal for the utilization of biography in the education of adoles-

cents. Imitation, wonder and the taste for anecdotes are the instinctive bases on which the educator can build. H. SCHOEN. *New Courses in Sex Morality in Germany*. 196-207. An account of the movement for instruction in sex hygiene in German *Gymnasias*. No. 3. September, 1910. M. MÜSCH. *The School and the Individual*. 305-317. The instruction of the schools has dealt with masses. Most of the studies of educational psychology have been mass studies. Yet the great need of the time is the development of the individual. Within the last decade progress has been made in the investigation of individual psychology, and teachers should have a better training in this type of psychology. L. CELLÉRIER. *Elementary Instruction in Modern Languages*. 326-342. An admirable analysis of the teaching of German and English to French children. B. LARCHET. *The School Museum: Its Value for the School*. 355-359. The best kind of school museum is one that the children have collected themselves, under the guidance and suggestive help of the teacher. No. 4. December, 1910. AD. FERRIÈRE. *The New Country Boarding Schools*. 462-496. An excellent illustrated account of the new private boarding schools in Europe and America of the type of Abbotsholme in England.

THE JOURNAL OF NERVOUS AND MENTAL DISEASES. Vol. 38. BURT G. WILDER. *Exhibition of and preliminary note upon a brain of about one-half the average size, from a white man of ordinary weight and intelligence*. 95-97. "This case seems to show that the ordinary human intelligence may be manifested by means of a brain one-half the usual size, exceeding that of certain apes by only 180 grams (about six ounces), and not quite double the weight of that of a congenital idiot."

PEDAGOGICAL SEMINARY, Vol. XVII. September, 1910. HARRY WOODBURN CHASE. *Psychoanalysis and the Unconscious*. 281-327. Brief exposition of the theories of the unconscious held by Herbart, Carpenter, Lipps, Wundt, Sidis, Prince, Myers and others, followed by an extended review and criticism of Freud's psychology. JOHN R. PELSMA. *A Child's Vocabulary and Its Development*. 328-369. Prints detailed vocabulary of his daughter and analyzes its development from birth to the fourth year, showing stages and methods of growth, development of pronunciation and sentence formation. Has bibliography of fifty-five titles. DAISY B. BROWN. *Young People's Ideas on the Value of Bible Study*. 370-386. Report, with comments, on 500 returns to a questionnaire on Bible study. HENRY H. GODDARD. *Four Hundred Feeble-Minded Children Classified by the Binet Method*. 387-397. Reviewed elsewhere in this JOURNAL. December, 1910. WALTER R. MILES. *A Comparison of Elementary and High School Grades*. 429-450. Statistical study indicating that the majority of pupils who take a high school course

have made rapid, or at least normal, progress in the elementary grades; that most high school students fail in some of their work; that the schools seem better fitted for girls than for boys; that individual rank remains about the same in the high school as in the elementary schools, and that the rank in any one subject represents approximately the rank in all subjects. SARAH E. SIMONS. *Imitative Writing in the High School*. 451-479. Urges teachers of English composition to make use of imitation. Prints numerous examples of imitations by high school students of the style of well-known writers. The method is a means, not an end. W. E. MCGOWN. *Report on the Hygienic and Sanitary Condition of a Public School Building*. 480-490. A scientific inspection of the grounds, site, heating, ventilation, illumination and sanitary appliances of a school building, reproduced here as an example of the kind of work that may be done in applied school hygiene. G. STANLEY HALL. *Physical Training*. 491-496. The average coach or trainer robs the athlete of the best lessons of self-discipline, does not train him in the art of keeping permanently and perfectly well. College and high school faculties should seek to utilize for intellectual and moral upbuilding the enthusiasm kindled by athletics. G. STANLEY HALL. *The National Child Welfare Conference: Its Work and Its Relations to Child Study*. 497-504. The conference "is a forum where genetic psychologists work for the exceptional child, get together and put mutual questions, report results, and pool their knowledge for mutual benefit." J. E. W. WALLIN. *A Boys' Exposition*. 505-509. At Cleveland, April 29 and 30, occurred the first exposition arranged for, and participated in by, boys. Over 2000 exhibits were viewed by 6000 visitors. Five divisions were made: industry, art, collections, pets, contests. These last were conducted in music, literature, oratory, costuming and gymnastics and were rewarded by ribbon prizes. The whole project appears novel and valuable. GENEVIEVE BOLAND. *Taking a Dare*. 510-524. Generalizations and conclusions from a study of 191 cases of "dares." Dare-taking reaches its climax at ten. Its origin is in instincts of fear and pride. Dare-taking, on the whole, should be discouraged. It is one of the greatest temptations to children, and is a frequent cause of misbehavior. WM. H. BURNHAM, PH.D. *European Investigations in School Hygiene*. 525-533. Recounts methods employed for combatting diphtheria in London, showing undesirability of closing schools, but extreme importance of detecting and isolating the "carriers." Also describes two epidemics of *tremor hystericus* at Basel that were finally checked by pedagogic treatment.



## PUBLICATIONS RECEIVED TO MARCH 1, 1911.

(Notice in this section does not preclude a more extended review.)

*Annual of the School of Pedagogy at the Royal University of Rome, for the Year 1910-1911.* Roma: Presso la Sede della Scuola, 1911. Pp. 140.

Contains, among other valuable items, an address by Professor Caporali on "Fifty Years of Legislation on Elementary Instruction in Italy," and another by Professor De Sanctis on "Experimental Psychology and Pedagogy."

*The Canal Zone Schools. Manual and Course of Study.* Mt. Hope, Canal Zone: Isthmian Canal Commission Press, 1910. Pp. 87.

Judging from this course of study, the school work of the Canal Zone is undoubtedly superior to that of most localities in this country. Of particular excellence is the plan of work in English and Hygiene.

P. CARUS. *Truth on Trial.* Chicago: The Open Court Publishing Co., 1910. Pp. vi, 138. \$1.

This volume includes several papers—most of them reprinted from the *Monist*,—in which Dr. Carus takes sharp issue with Professor James, Mr. Schiller, and other protagonists of pragmatism.

H. H. HORNE. *Idealism in Education.* New York: The Macmillan Company, 1910. Pp. xxii, 183.

This book will be reviewed in a later number of the JOURNAL.

WILLIAM LEE HOWARD, M.D. *Plain Facts on Sex Hygiene.* New York: Edward J. Clode, 1910. Pp. 171. \$1.

A straightforward, vigorous discussion of venereal diseases, their causes, spread, consequences and prevention. To be reviewed later.

JOSEPH JASTROW. *The Qualities of Men.* Boston: Houghton Mifflin Company, 1910. Pp. 183. \$1.

A study of the salient characteristics of individuality from the point of view of modern psychology. The teacher will find many delightful and helpful passages in it.

HIKOZO KAKISE. *A Preliminary Experimental Study of the Conscious Concomitants of Understanding*. Reprinted from *American Journal of Psychology*, 22: January, 1911. Pp. 14-65.

An interesting contribution to the "imageless thought" controversy. "A chief condition determining whether or not one shall have a definite image (visual or verbal or other), in understanding familiar words or phrases, is the length of time the process continues. If one reacts quickly, *i. e.*, at the stage of familiarity, or concept, etc., one will not have, as a rule, any definite images, regardless of individual differences, and of the concreteness or abstractness of the stimulus. If one dwells longer upon the stimulus one will usually have some particular representations, the majority of which will be recent memorial associations, in predominantly visual form, in the case of visualizers, and in predominantly verbal form, in the case of verbalists, regardless of the concreteness or abstractness of the stimulus."

E. B. LOWRY. *Truths. Talks with a Boy Concerning Himself*. Chicago: Forbes & Co., 1911. Pp. 95. 50c. net.

A series of simple, straightforward talks with a boy who is about to leave home for school, informing him of the changes that take place at puberty, warning him against quack medical advertisements, and pointing out the dangerous consequences of "sowing wild oats."

PAUL MONROE. Editor. *A Cyclopedia of Education, Vol. I*. New York: The Macmillan Company, 1911. Pp. xiii, 654. \$5 net.

This volume is the first of the five which the Cyclopedia will include, and contains articles from "abacus" to "Chrysostom." Among the longer and more important psychological articles we note: Ability, Acquired Characteristics, and Apperception, by E. N. Henderson; Activity, by C. H. Judd and John Dewey; Adolescence, by A. E. Tanner, G. Stanley Hall and W. H. Burnham; Aphasia, by S. I. Franz; Arithmetic, by D. E. Smith and W. H. Burnham; Association, by W. B. Pillsbury; Attention, by J. R. Angell; Character, by John Dewey; Child Psychology, by Naomi Norsworthy, and Child Study, by E. A. Kirkpatrick. The Cyclopedia is an indispensable reference work for the teacher's library.

F. W. MOTT. *The Brain and the Voice in Speech and Song*. New York: Harper & Brothers, 1910. Pp. 107.

This is a most excellent little handbook on the matter of a common function and experience which is but little understood. It is written mainly from the anatomical point of view, but contains many hygienic and other practical suggestions on voice production in speech and song.

HUGO MUENSTERBERG, THEODORE RIBOT, PIERRE JANET, JOSEPH JASTROW, BERNARD HART AND MORTON PRINCE. *Subconscious Phenomena*. Boston: Richard G. Badger, 1910. Pp. 141. \$1.20 net.

A symposium of six articles, reprinted from the *Journal of Abnormal Psychology*, and constituting the most authoritative discussion of that elusive term, the subconscious. Would that the book might have a wide circulation among a certain class of pseudo-psychologists, who fancy they have explained a phenomenon when they have referred it to the subconscious!

WILHELM OSTWALD. *Natural Philosophy*. New York: Henry Holt & Co., 1910. Pp. 185.

"A brief survey of all science, aiming to provide a complete synthesis of the results of the specialization of the last half century." A statement of the fundamental concepts common to all science.

C. BERNALDO DE QUIRÓS. *Modern Theories of Criminality*. (Translated from the 2d Spanish edition, by Alfonso de Salvio, Ph.D.) Boston: Little, Brown & Co., 1911. Pp. xxvii, 249. \$4 net.

This is the first book in the Modern Criminal Science Series which comprises nine translations of important treatises in criminology in foreign languages, published under the auspices of the American Institute of Criminal Law and Criminology. Will be reported more fully in a subsequent issue.

GEORGE L. RAYMOND. *Education, Art and Civics*. New York: Funk & Wagnalls, 1911. Pp. 343.

An interesting collection of addresses and papers of historical interest, some of them prepared a third of a century ago.

WILLIAM S. SADLER, M.D. *The Cause and Cure of Colds*. Chicago: A. C. McClurg & Co., 1910. Pp. 147. \$1 net.

Probably there is no more widespread and distressing malady than the common cold. Not only is it disagreeable and inconvenient in itself, but it is frequently the harbinger of some more serious malady of the throat and lungs. Yet most colds are probably due to ignorance. This little volume presents in simple statement an excellent scientific discussion of the cause and nature of colds, and gives explicit and profusely illustrated directions for treatment and speedy cure. It will certainly save doctor's bills, and may save lives.

JESSIE E. SAMPTER. *The Seekers*. (With an introduction by Professor J. Royce.) New York: Mitchell Kennerley, 1910. Pp. xii, 302. \$1.25.

A report of the meetings of a club of six adolescent boys and girls who, under the guidance of an adult leader, discussed some of the fundamental problems of life. The dialogues have some valuable suggestions for high school teachers who understand and appreciate the adolescent's serious attitude toward the eternal problems.

B. S. TALMEY, M.D. *Psyche: A Concise and Easily Comprehensible Treatise on the Elements of Psychiatry and Psychology*. New York: The Medico-Legal Publishing Company, 1910. Pp. viii, 282. \$2.50.

This book is written primarily for students of medicine and law, who need a general knowledge of psychiatry, but have no opportunity "to wade through more extensive text-books." We hope to give further account of it later.

W. PERCIVAL WESTELL. *The Book of the Animal Kingdom (Mammals)*. London: J. M. Dent & Sons, Ltd. New York: E. P. Dutton & Co., 1910. Pp. xx, 379. \$4.

A "natural history" book of a very "popular" type.

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We have laws regarding compulsory attendance at school in almost every State, but at a recent meeting of school men in New York City a public school principal pointed out the extreme difficulty of getting these laws enforced. The trouble lies in the division of authority. The school authorities have no power to enforce the law, but the most that can be done is to make a complaint to the magistrate, and too often the magistrate seems to be entirely out of sympathy with the efforts of the school. In Sweden the situation is quite different. Not only do the school authorities have ample power to enforce the attendance law, but if a child of school age is arrested for a misdemeanor, instead of being brought before a criminal or juvenile court, he is turned over to the school officials, the case is investigated by the attendance officer, the principal and the teacher to whom the child is responsible, a report is made and action is taken accordingly. Thus the "Superior School Commission," as one of its members has said, has more power than any other body in Sweden, more than the courts themselves.

# THE SCIENTIFIC STUDY OF THE TEACHING OF SPELLING.

HENRY C. PEARSON,

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## I.

It is encouraging to note the genuine interest that progressive teachers are taking in the scientific study of teaching method. Too long have we been satisfied to condemn or approve a method of instruction by the expression of mere personal opinion, without attempting to measure carefully the results. It is a sign of real progress when such loose methods of judgment are giving way to accurate and painstaking measurements of results such as the modern scientist uses in interpreting his facts. It is true, of course, that there are values in education that cannot, so far as we now know, be measured by modern statistical methods, but this fact should not prevent the student of education from applying those methods wherever quantitative measurement is possible.

It is the purpose of this article to describe an experiment that was designed to decide between two controverted details in the teaching of spelling, and to point out further lines of investigation in spelling instruction that may be pursued by experiments of a similar type. The point that the writer wishes to emphasize is not the importance of the question investigated, for that is relatively trivial, but the method of experimentation employed.

Educational investigation should not be crudely empirical, nor merely psychological; it should test the efficiency and the economy of a single factor in the teaching process when surrounded by the normal accompaniments of its classroom situation. The type of experimentation employed by the trained psychologist in his laboratory is exceedingly useful, but it has its limitations. Its chief defect is that it isolates from its natural setting the issue to be tested. The experiment about

to be described is of the comparative type. Its method is to compare accurately two controverted points in the teaching process, taking care that the other factors of the normal classroom setting be as nearly identical as possible. Both types of experimentation, the psychological and the comparative, are valuable, but they should supplement each other. A proper combination of the two would seem to offer the most satisfactory foundation for the scientific study of teaching method.

## II.

### AN EXPERIMENT IN THE TEACHING OF HOMONYMS.

It is current practice in our schools to teach homonyms in pairs or groups, such as *piece, peace, colonel, kernel*. Some people, however, have claimed that such a grouping together confuses the pupil and that it would be better to teach each word separately, with some interval of time between the two. The object of this experiment was to determine, so far as possible, which of the two methods is the better.

The Horace Mann School is well adapted to such a study because in each grade there are two sections of the same size and of practically the same native ability. The general plan of the experiment was first to test the ability of each grade to spell certain selected homonyms, then to have these homonyms taught by the regular teacher of one room by one method, and by the teacher of the other room of that grade by the other method. After that the pupils were to be examined again on the same homonyms and the results compared with those of the first test.

The object of the first examination was to test the ability of the pupils to spell ten pairs of homonyms as they occurred in twenty detached sentences, an effort being made not to have the pupils realize that they were being tested on these particular words. Consequently, only the following explanation was made before the sentences were dictated: "I am going to dictate to you several short sentences. You will be given time enough to write each one carefully. I will pronounce each sentence twice, and no questions will be answered." The object of allowing ample time and of pronouncing each sentence twice was that inability to spell the word should be, so

far as possible, the only reason for making a mistake. The papers were then corrected, and from the ten pairs of homonyms five pairs were selected that presented the most difficulty to the grade. The homonyms selected in this way for each grade were the following:

GRADE III	GRADE IV	GRADE V	GRADE VI	GRADE VII
pair	ate	bow	kernel	dual
pear	eight	bough	colonel	duel
fair	there	seen	serial	bridle
fare	their	scene	cereal	bridal
pail	to	peace	dessert	peer
pale	too	piece	desert	pier
rode	whole	burrow	aisle	plain
road	hole	borough	isle	plane
led	tail	meddle	ceiling	feint
lead	tale	medal	sealing	faint

In arranging to have these words taught in the two rooms of each grade great care was taken to have all the factors constant except that in one room the homonyms were to be taught side by side and in the other room with an interval of three or four days between the words of each pair. The teachers were called together and the exact method to be used was carefully explained. A uniform time limit of fifteen minutes was placed on the spelling lesson, and the exact words to be taught in each room were specified. The following brief outline of the method of teaching agreed upon was then placed in the hands of each teacher, together with the words to be taught and the date of each lesson. It was further agreed that these words should not be reviewed or taught in any other way than specified.

#### STEPS IN TEACHING HOMONYMS

- |  |  |
|--|--|
| <p>I. (When taught together)</p> <p>"Here are two words that are pronounced alike, but spelled differently, because they have different meanings. Look at them carefully."</p> <p>Then have pupils copy them to establish correct visualization.</p> | <p>(When taught separately)</p> <p>"Look at this word carefully. Copy it." (To see if it is visualized correctly.)</p> |
|--|--|
- II.. Bring out meaning by concrete illustration; then let the teacher summarize by giving careful definition.
- III. *Oral* application by pupils, using word in sentence; then have each pupil write a sentence using it.
- Bring out in all cases the three factors of *meaning, sound and written form.*

The following words were selected for each lesson. It will be noticed that the words to be taught in each room of a given grade are the same, the only difference being that in one room the homonyms are brought together, while in the other room they are separated:

WEDNESDAY, NOVEMBER 20					
Grade III		Grade IV		Grade V	
Room 109 (Together)	Room 110 (Separate)	Room 200 (Together)	Room 111 (Separate)	Room 201 (Together)	Room 202 (Separate)
witch	witch	potato	potato	shoulder	shoulder
some	some	promise	promise	(noun)	(noun)
fair	fair	there	there	pigeon	pigeon
fare	pale	their	too	bow (verb)	bow (verb)
told	told	pencil	pencil	bough	scene
		neighbor	neighbor	scissors	scissors
				cough	cough
				bureau	bureau
FRIDAY, NOVEMBER 22					
ghost	ghost	cellar	cellar	alcohol	alcohol
afraid	afraid	wrong	wrong	necessary	necessary
pail	pair	hole	hole	medal	medal
pale	lead	whole	eight	meddle	burrow (vb.)
ache	ache	Wednesday	Wednesday	village	village
		women	women	business	business
				bouquet	bouquet
MONDAY, NOVEMBER 25					
such	such	carriage	carriage	group	group
between	between	scenery	scenery	religious	religious
rode	fare	to	to	peace	peace
road	road	too	tail	piece	bough
roof	roof	musician	musician	colonel	colonel
		ache	ache	agreeable	agreeable
				antique	antique
WEDNESDAY, NOVEMBER 27					
alone	alone	benefit	benefit	creature	creature
pretty	pretty	necessary	necessary	celery	celery
led	led	ate	ate	borough	borough
lead	pear	eight	their	burrow	meddle
who	who	autumn	autumn	pursue	pursue
		success	success	physician	physician
				service	service
TUESDAY, DECEMBER 3					
noise	noise	professor	professor	parallel	parallel
shoes	shoes	biscuit	biscuit	anchor	anchor
pair	rode	tale	tale	seen	seen
pear	pail	tail	whole	scene	piece
music	music	height	height	foreigner	foreigner
		governor	governor	nuisance	nuisance
				recognize	recognize



## WEDNESDAY, NOVEMBER 20

Grade VI		Grade VII	
Room 206 (Together)	Room 203 (Separate)	Room 208 (Together)	Room 209 (Separate)
neighbor	neighbor	acknowledge	acknowledge
rehearse	rehearse	architect	architect
prairie	prairie	alcohol	alcohol
aisle	aisle	bridle	bridle
isle	colonel	bridal	pier
disappoint	disappoint	disease	disease
delicious	delicious	liquor	liquor
mosquito	mosquito	scheme	scheme

## FRIDAY, NOVEMBER 22

mucilage	mucilage	decrease	decrease
lieutenant	lieutenant	chasm	chasm
jealous	jealous	edifice	edifice
dessert	dessert	plane (verb)	plane (verb)
desert (verb)	sealing	plain	duel
scenery	scenery	politics	politics
deceive	deceive	calendar	calendar
virtuals	virtuals	siege	siege

## MONDAY, NOVEMBER 25

pursuit	pursuit	secession	secession
science	science	deign	deign
biscuit	biscuit	maneuver	maneuver
kernel	kernel	peer	peer
colonel	isle	pier	feint
asylum	asylum	coupon	coupon
alcohol	alcohol	sufficiency	sufficiency
leisure	leisure	naphtha	naphtha

## WEDNESDAY, NOVEMBER 27

cologne	cologne	mahogany	mahogany
ferocious	ferocious	virtue	virtue
exercise	exercise	successor	successor
serial	serial	dual	dual
cereal	desert (verb)	duel	bridal
scheme	scheme	courteous	courteous
yacht	yacht	service	service
brilliant	brilliant	apparatus	apparatus

## TUESDAY, DECEMBER 3

conscience	conscience	analyze	analyze
decision	decision	decisive	decisive
character	character	cologne	cologne
ceiling	ceiling	faint	faint
sealing	cereal	plain	plain
fatigue	fatigue	mosquito	mosquito
cyllinder	cyllinder	parallel	parallel
carriage	carriage	hygiene	hygiene

After ten days had elapsed since the last spelling lesson the pupils of the five grades were examined again on these homonyms. This final test was given under conditions exactly similar to those of the first test, except that the sentences dictated were not the same, but were sentences employing the homonyms under practically similar conditions. Both the first test and the final test were conducted by the writer in person, and care was taken to give the test to the two rooms of a grade at practically the same time in the school session, so that the fatigue of the class might not be a greater factor in one room than in the other.

The papers of the first test and the final test were then examined carefully and the results tabulated as shown in the following summary:

TABLE I, *Showing Total Decrease in Errors.*

Grade.	TOGETHER.						SEPARATE.					
	Room.	Errors on First Test.	Errors on Final Test.	Net Decr.	No. of Pupils.	Average Decr. per Pupil. — 10 Max.	Room.	Errors on First Test.	Errors on Final Test.	Net Decr.	No. of Pupils.	Average Decr. per Pupil. — 10 Max.
III	109	142	66	76	29	2.62	110	148	87	61	26	2.35
IV	200	58	26	32	27	1.19	111	74	54	20	27	.74
V	201	101	70	31	27	1.15	202	136	89	47	27	1.74
VI	206	142	41	101	27	3.78	203	120	76	44	27	1.63
VII	208	97	29	68	25	2.72	209	95	54	41	26	1.58
						Av. per grade, 2.29						Av. per grade, 1.61

It will be seen that this summary shows a gain in efficiency for the together method in every grade except the fifth. It is obvious, however, that such a method of comparison may not be a true measure of the relative value of the two methods. For example, if one method showed a net decrease in errors of 30, that is a change from 100 errors on the first test to 70 errors on the final test, while another method showed a similar decrease of 30 errors, but a change from 50 errors to 20 errors, obviously the latter method would be far better, because in the former case there was more room for improvement. It was necessary, therefore, to submit the results to a different kind

of comparison. This was done by computing the average gain of all those who had one error on the first test, then of those who had two errors, and so on. The results of this method of comparison are shown in Table II.

TABLE II. *Showing Average Improvement as Based Upon Groups Arranged According to Number of Errors in First Test.*

Errors on First Test.	III.		IV.		V.		VI.		VII.	
	Room 109.	Room 110.	Room 200.	Room 111.	Room 201.	Room 202.	Room 206.	Room 203.	Room 208.	Room 209.
	To-gether.	Sepa-rate.	To-gether.	Sepa-rate.	To-gether.	Sepa-rate.	To-gether.	Sepa-rate.	To-gether.	Sepa-rate.
	Aver. Impr.	Aver. Impr.	Aver. Impr.	Aver. Impr.	Aver. Impr.	Aver. Impr.	Aver. Impr.	Aver. Impr.	Aver. Impr.	Aver. Impr.
1	1.		.4	0	0		.5	.7	0	1.
2	1.7	0	1.1	.3	1.	.2	1.7	1.	1.5	3.
3	2.7	2.	1.	1.1	.5	2.5	2.	0	2.3	1.
4	3.	2.7	2.3	1.	1.2	1.	3.	.6	2.9	2.
5	2.7	2.5	4.	2.	1.5	2.	5.		3.3	2.6
6	3.3	2.7			1.2	2.7	4.	1.5	4.5	2.
7	3.	2.7			1.5	2.	5.4	3.	4.	1.5
8	3.	1.			7.	2.5	5.7	4.5		
9		3.5					4.7			
10		3.								
Totals.	20.4	20.1	8.8	4.4	13.9	12.5	32.	11.3	18.5	13.1

A study of Table II shows that the together method is the more efficient in all grades. The reversal of the situation in Grade V is interesting. It will be noted that the pupils who made eight errors on the first test, that is, the poorest spellers, made a decided gain by the together method; so much so, in fact, that the total average gain by the together method was greater than by the separate method.

TABLE III. *Derived from Table II, Showing Improvement of the Good Spellers as a Group and the Improvement of the Poor Spellers as a Group.*

Grade.	GOOD SPELLERS.		POOR SPELLERS.	
	Totals of average Improvements by Together Method.	Totals of average Improvements by Separate Method.	Totals of average Improvements by Together Method.	Totals of average Improvements by Separate Method.
III	11.1	7.2	9.3	12.9
IV	2.1	1.4	6.3	3.
V	2.7	2.3	11.2	9.2
VI	7.2	2.3	20.1	9.
VII	6.7	6.	11.8	6.1

Table III compares the good spellers as a group and the poor spellers as a group. Here again the together method seems, on the whole, to be superior both for good and poor spellers, the only exceptions being for the poor spellers of Grade III and the good spellers of Grade V.

Inasmuch as the evidence in favor of the together method was not as positive in Grade V as in the other grades, the median, the average, and the average deviation for Grade V were computed.

TABLE IV, *Showing the Median, Average, and Average Deviation for Grade V. Figures Represent the Number of Errors.*

	TOGETHER METHOD.		SEPARATE METHOD.	
	First Test.	Final Test.	First Test.	Final Test.
Median.	3.78	2.86	5.6	3.3
Average	3.3	2.9	5.5	3.2
Aver. Dev.	1.7	1.5	1.3	1.2

Owing to the inequality in the units of measurement it is impossible to determine accurately from Table IV whether the together method is superior to the separate method. One cannot decide, for example, positively whether an improvement from 3.78 errors to 2.86 errors is greater or less than an improvement from 5.6 errors to 3.3 errors. Of course the gain in the latter case expressed numerically is greater, but this is offset, partially at least, but how much we do not know, by the fact that improvement was easier to secure when the median of the first test was 5.6 than when it was 3.78.

It may be said that not enough pupils were examined to establish the validity of the conclusion of this experiment. The reliability of these figures, however, has been computed with the result that beyond any reasonable doubt we may say that the conclusion would not be changed if the number of pupils tested was increased almost indefinitely.

There is one element of uncertainty that could not be eliminated by this experiment, namely, the effect of the personality of the teacher. This can be done by trying the experiment in other schools under similar conditions. It is hoped that this may be done so that, if the same general results in favor of the together method of teaching homonyms are obtained, a final conclusion may be reached concerning this one factor in the teaching of spelling.

This experiment has recently been tried in the Montclair, N. J., public schools, under the direction of Mr. Archibald S. Knight, Principal of the Central Schools. Mr. Knight used the same dictation tests, word lists, and teaching directions as were used in the Horace Mann School, and the results were measured by the same methods. The following summaries (Tables V and VI) show the conclusions:

TABLE V, *Showing Total Decrease in Errors in the Tests at Montclair, N. J.*

Grade.	TOGETHER.						SEPARATE.					
	Room.	First Test.	Final Test.	Net Decr.	No. pupils.	Av. Decr. per pupil.	Room.	First Test.	Final Test.	Net Decr.	No. pupils.	Av. Decr. per pupil.
III	B	124	46	78	26	3.00	A	79	23	56	23	2.43
IV	B	109	58	51	37	1.57	A	66	37	29	31	.93
V	A	74	26	48	27	1.78	adv.	126	65	61	29	2.103
VI	B	158	47	111	23	4.83	A	143	42	101	30	3.38
VII	B	101	41	60	30	2.00	A	85	14	71	31	2.29
					143	Av. per grade. 2.63					144	Av. per grade. 2.24

TABLE VI, *Showing Average Improvement as Based Upon Groups Arranged According to Number of Errors in First Test at Montclair, N. J.*

Errors on First Test.	III.		IV.		V.		VI.		VII.	
	Room 3 B. Together. Aver. Impr.	Room 3 A. Separate. Aver. Impr.	Room 4 B. Together. Aver. Impr.	Room 4 A. Separate. Aver. Impr.	Room 5 A. Together. Aver. Impr.	Room 5 Adv. Separate. Aver. Impr.	Room 6 B. Together. Aver. Impr.	Room 6 A. Separate. Aver. Impr.	Room 7 B. Together. Aver. Impr.	Room 7 A. Separate. Aver. Impr.
1	.5	.6	0	0	.3	1.	1.	1.	-.6+	.6+
2	1.	.5	.5	1.5	1.	1.3	-2.	1.6+	.8+	1.8
3	.3	2.	2.	1.	1.	.8	2.	2.	2.4	.3
4	3.	4.	2.5	2.8	3.	1.7	2.5	3.	2.	3.5
5	2.7	4.	4.5	4.	3.	3.2	3.2	2.	4.	5.
6	4.	3.7	4.5	3.	....	2.3	5.	5.	4.	5.5
7	3.5	....	2.	3.	6.	2.5	6.	4.8	5.	4.
8	7.5	....	....	....	....	4.6	....	6.	....	....
9	7.	7.	4.	....	9.	....	6.	6.	6.	....
10	....	....	....	....	6.	....	9.	....	....	7.
11	6.5	....	....	....	....	....	....	9.	....	....
12	....	....	....	....	....	....	7.5	....	....	....
Total.	36.	21.8	20.	15.3	29.3	17.4	40.2	40.4	23.6	27.7

It is interesting to note that the situation in Grade V was the same in Montclair as at Horace Mann. The separate method, according to Table V, was slightly superior to the together method, but this was reversed by the method of measurement used in Table VI. The reason for this reversal was the same as at Horace Mann, namely, the marked improvement of the poorest spellers.

The following quotation from Mr. Knight's letter may partially explain the fact that in Montclair the separate method seemed superior to the together method in Grade VII:

"This reversal in seventh grade results may be due entirely to the superior spelling ability possessed by VII pupils, although I thought that in spelling there was no great difference between the classes. In assigning the separate method, which seems to have least in its favor, I purposely gave this method to pupils having a trifle higher scholarship average.

"However, I sought to give the tests to the classes as nearly equal in ability as possible. The together method in most instances seems to have overcome any slight handicap that may have existed, thus furnishing quite conclusive evidence in its favor."

## III.

## PROBLEMS FOR EXPERIMENTATION.

The following are some of the mooted points in the teaching of spelling that should be carefully investigated. Some of these can best be determined by experiments of a comparative type similar to the one described in this paper, others can be investigated by simply measuring in a scientific manner the results obtained in different school systems, but in all cases we should cease to give much value to the "lumped" personal judgment of individual teachers.

- (1) *Formal vs. incidental teaching.* May we rely upon teaching spelling incidentally in connection with other school subjects to the exclusion of the period set aside upon the daily program for formal instruction? The investigations of Rice, Cornman, and others have tended to discredit so much formal teaching as many schools have given. On the other hand, a forthcoming book by Dr. Wallin will describe experiments showing that formal teaching is better. At all events, the question remains unsettled, and furnishes an interesting and valuable field for experimentation.
- (2) *Class study vs. independent study:* Can we secure better results by using the spelling period for controlled learning under the direction of the teacher and allowing no outside study, than by the more customary practice of merely testing in class whether or not pupils have learned the lesson by themselves? In other words, what is the best way of using the fifteen minutes generally assigned to spelling? Experiments on this issue have recently been conducted in the Horace Mann School, and will be described fully in the May issue of the *Teachers' College Record*.
- (3) *Isolated vs. contextual spelling.* To what extent does the mastery of a word in isolation (oral or written spelling of single words or of a list of words) imply the ability to spell a word in composition or context? This is a question of great importance, and much light will be given by a careful measure of quantitative results.

- (4) *Grouping of words in lists.* How helpful would it be to have words grouped in lists according to (a) common roots, suffixes or prefixes, (b) common phonograms, (c) common rule of spelling as a basis, (d) unity of association in their meaning, as when all the words are names of colors, tools, etc.? It is common in some schools to group words in this way in the lower primary grades, but would it be helpful in the upper grades also?
- (5) *Syllabication.* Does the pupil learn words more readily when they are divided into syllables? Some spelling books do not separate the words into syllables, while others do. It is a problem that presents many complications of a psychological nature, but carefully planned experiments of a comparative type would probably point to the truth of the issue.
- (6) *Number of words for a spelling lesson.* Are we attempting to teach too many words at each lesson? How many more words can be learned in a fifteen-minute period by a seventh grade pupil than by a third grade pupil? The work in the Cleveland public schools is interesting in this connection.

There are many other vital issues, a careful consideration of which would carry one beyond the limits of a brief article. I refer to the questions concerned with the association of the different factors involved in the learning of words, with the various methods of correcting misspelled words, and with the best method of selecting the vocabulary.



## PEDAGOGICAL PSYCHOLOGY OF REPORT.<sup>1</sup>

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Ever since the earliest days of pedagogical psychology the problems of memory have occupied a prominent place in the consideration of investigators. But the treatment of these problems has been somewhat one-sided. Only that function of memory which expresses itself in learning and in retaining and forgetting material previously learned has been taken into account. The experiments, which are termed "memory"-experiments simply, consist essentially in giving the observer some sort of material, usually verbal, with the instruction that he shall so master this material as to be able later verbally to reproduce it. Thus it is characteristic of this sort of experiment that from the beginning the attention is directed to that which is later to be reproduced.

Without doubt, these experiments do not exhaust the far more extended rôle which memory plays in our mental life. For we retain not only those impressions which were received when the attention was especially directed to them, but we remember also experiences and details of experiences which were originally not direct objects of our attention. There can be no doubt that this latter function of memory is, not only for the adult, for whom it is the exception to "learn" in the narrow sense of the word, but also for the child, of uncommonly greater practical significance than that which comes into play in memorizing.

It is the service of Stern (9) to have been the first to open up this other side of the memory-problem to an experimental treatment. He was especially interested in the legal significance of just this last-mentioned function of the memory, and

<sup>1</sup>Translated from the author's manuscript by DR. HELEN D. COOK, Instructor in Psychology, Wellesley College. The word *Aussage* is translated "report," except in the case of the *Aussage* of a *Zeugen* (legal witness), where the translation "testimony" is used.—EDITORS.

contrasted this process of reporting [*Aussage-Leistung*] with the phenomena connected with the process of learning. In truth, the testimony of a witness has to do, if not entirely, still very essentially, with those details of an experience to which, at the time, he did not especially direct his attention.

Accordingly, Stern formulates the question: *What is the result when some one who has had a certain experience is later called upon to give a report about the details of this experience?* This problem, in many different phases, has been the subject of a large number of experimental investigations.<sup>2</sup> The material for the report has been varied (pictures, narratives, events, localities), as has been also the time intervening between the original experience [*Wahrnehmung*] and the report, the form of questioning and the division of attention during the experience. A comparison has been made also of reports of different categories of persons (educated—uneducated, masculine—feminine, adults—children). To this large number of formulations of the problem corresponds a large mass of detailed results, which, however, at the present time, can be considered only incompletely established. They are, in part, of a general psychological nature; in part they are directed toward solving the practical problem of the reliability of the testimony of witnesses. In this paper we shall confine ourselves to those results which seem of pedagogical significance; that is to say, to those which have to do with the reports of children.

The first and most obvious result of the report-research is to show that reports are in general extremely unreliable. While this is true to a high degree even of the reports of adults, the number of misstatements shows a marked increase when the reports of children are investigated. And it must be noted in this connection that there was absolutely no reason why the observers should purposely tell an untruth. We may certainly assume that in all the experiments under consideration the report was always given “according to the best knowledge and belief” of the observer. When, in spite of this fact, so many mistakes are made, it must furnish food for thought not

<sup>2</sup>(10), (4), and the bibliography in the *Zeitschrift für angewandte Psychologie*, Vols. I and IV.

only to the judge who has to do with the testimony of witnesses, but also to the educator. For how often the latter meets with notorious untruths, and is then all too ready with the accusation of "lying." Against such an attitude I should like to emphasize what seems to me pedagogically the most important result of the report-research: that the deduction from untruthfulness to lying is by no means invariably justifiable; that, on the contrary, in addition to the *will* to speak the untruth, there are quite other causes for mistakes in reports; and that it is just in the case of the child that these other causes play an unusually important rôle.

When we attempt to classify the factors that can lead to a false report we must distinguish between conditions which affect (1) the perceiving [*Wahrnehmung*], (2) the remembering and (3) the report itself.

Let us begin with the first, and ask what it is that differentiates the perception of the child from that of the adult in such a way as to result in a less reliable report. One might assume that the child's power to concentrate his attention on the reported object is actually less than that of the adult. For this assumption, however, we have no valid ground. On the other hand, I believe that we may rightly assume that the child and the adult direct their attention to entirely different details of an experience. For if a child is shown a picture and asked to describe what he sees—if, that is, a perception-report instead of a memory-report is demanded of him—it is astonishing how his interest and attention are directed toward details that, at first at any rate, the adult does not notice at all. And, on the other hand, the child does not notice, or at most notices only secondarily, just those details which seem to the adult the "essential" ones. That this fact must play an important rôle in the memory-report as well, I have, though not strictly proved, still made very probable by the following argument (3): If the distribution of attention were the same for all individuals, and only the *degree of concentration* showed quantitative differences, then those objects which were noticed most by one class of individuals, about which, that is, we obtain the best reports, would be the ones most noticed by other persons also. One would expect, of course, to find quantitative differ-

ences in the absolute number of mistakes, but the order of objects when arranged according to the accuracy with which they were reported would be the same for all classes of observers. This is, however, not the case, and differences in such an order can, in my opinion, be due only to differences in the distribution of attention. It is true that no one has yet succeeded in determining *how* the child's distribution of attention differs from that of the adult. I can only mention, in this connection, a result of Stern's (8) which, while it presumably does not exhaust the differences with which we are here concerned, certainly has a bearing on the question. Stern distinguishes a "Substance"-stage, an "Actuality"-stage and a "Relation"- and "Quality"-stage. From the reports characteristic of these different stages we may perhaps conclude: that the child at first notices mainly objects; later he turns his attention to their properties and to actions, and only during the last stage does he notice the relations between objects. After noting these facts it will not seem strange to us that, in experiments as in life, the child's report seems more defective than that of the adult. For in the latter, as in the former, we question him mainly about those details which seem to us adults essential, but which are not at all "essential" to the child, and which he, therefore, leaves more or less unnoticed. *We* indeed have reasons for calling just those details essential, but for the child these reasons do not yet exist. If the child, in his turn, were to formulate the questions, probably the adult would succeed equally ill in reporting details which for the child are essential. Thus far, then, we have strictly no right to call the report of the child faultier than that of the adult. Cautiously formulated, all that we ought to say is that the child reports *certain* things—and just those details that seem to the adult essential—more poorly than does the adult. Here, then, as almost everywhere in child psychology, we find that we must trace quantitative differences—the number of mistakes in the report—back to qualitative—the distribution of attention. On every side we meet with the fact that the adult differs from the child not only in a bare *more* or *less*, but in a *thus* and *so* not capable of being quantified.

This view seems, however, to leave one objection still unanswered, namely, if a child is questioned about things that he has not noticed, he might be expected to answer, "I don't know," and thus *gaps* in his report, but not actual *mistakes* would be explained. But both gaps and mistakes in a report evidently point to corresponding defects in the memory of the reported object, and here we find an intimate connection between gaps and mistakes. For we can observe in our own mental life a tendency to fill out somehow the gaps in our memories *when once our attention is called to them*; and, naturally, this filling out does not always occur in a way that corresponds to reality.

When, next, we ask how the child has his attention called to such memory-gaps, we come to a further group of factors that may result in mistakes in the report—those, namely, that lie in the condition of the report itself. An essential factor here is the form of the report, whether it is a free "narrative," or, on the other hand, an "interrogatory," consisting in answers to questions. As a matter of fact, the narrative is usually incomplete, but relatively free from mistakes, while in the interrogatory the answer "I don't know" seldom occurs, but a large proportion of the statements are wrong. The reason is just that given above: by the question the child's attention is called to gaps in what he remembers, and these gaps he then fills out. If the question itself does not suggest an answer, then the filling out usually follows along customary lines. When, for example, I ask the color of a certain piece of furniture, I usually receive the answer "yellow" or "brown," even if the particular piece of furniture in question was of some other color. Other children (3), on the contrary—perhaps the less intelligent, though that is not yet determined—have a way of emancipating themselves from custom and giving free play to their fancy in filling out such gaps.

In this connection one question deserves more detailed treatment: Why does the child accept so readily for filling out the gaps in his memory any material that comes to hand, whether through suggestion, through his own imagination or through custom? This brings us to a further fundamental characteristic of the childish imagination, which furnishes another rea-

son why the child's reports are more faulty than those of the adult. This fundamental characteristic is that everything that is imagined is imagined as *real*. Independently of whether an image comes as a memory-image, or is called up by fancy or by suggestion, always at first it bears for the child the character of a memory-image, *i. e.*, it plays the rôle of a real experience. In this crude formulation the statement holds, of course, only for the very small child. For soon the increasing store of experience brings with it the recognition that much which fancy pictures for its own pleasure behaves quite differently in crude reality.

“Leicht bei einander wohnen die Gedanken,  
Doch hart im Raume stossen sich die Sachen.”

But even with the school child this recognition is relatively so little developed that the lack of it may be held responsible for many wrong reports.

A further discussion of the part played by fancy in causing wrong reports may be omitted here, since, in the nature of the case, this factor does not admit of an experimental treatment. But even here observation has brought to light much valuable material (7). On the other hand, the investigation of suggestibility (2) has proved to be a fruitful field for experimental report-research.

In discussing suggestion let us not confine ourselves to the narrower and technical sense of the term, but extend our study to include any influence of suggestive questions (6), though such influence is not by any means always that of suggestion proper. We find here a definite dependence of grade of suggestibility on the age of the observer; younger children prove to be very much more suggestible than older children or adults. In order to understand this fact we must make clear to ourselves the different possible ways in which suggestive questions may exert an influence. Let us consider, first, suggestion in the technical sense. This occurs when a question about a detail of an experience alters an actually existing knowledge about that experience. For example, the observer has seen a room with two windows, and remembers the fact correctly. Now, when asked if the room did not have three

windows, he revises his memory and makes his report agree with the question. It is evident that such a result will be the more likely to appear the weaker and hazier the memory of this detail of the experience is, on the one hand, and, on the other, the more authority the questioner has over the person questioned. In the case of young children it is obvious that both these factors are present to a high degree. What ground we have for assuming that a child's memory of those details about which we usually ask is incomplete has been shown above. And the degree of authority which the questioner exerts over the one questioned may be assumed to be approximately proportional to the difference in their ages. Not only does the authority of the questioner under some circumstances cause the observer to revise his knowledge, but very often the effect of a question put by a person in authority is that the observer does not consult his own knowledge at all in giving his answer. The essence of the suggestive question, then, consists in the fact that it actually puts certain answers into the mouth of the person questioned. So that very often such an answer is given without any reflection, for the observer says to himself, "If the respected person who is questioning me expects such an answer, then it must be the right one." Indeed, the authority of the questioner can, by means of suggestive questions, bring about answers that are almost lies. The answer suggested by the question is sometimes given even contrary to the better knowledge of the observer, either because the latter is too shy to contradict, or because he wants to please the questioner or to escape from further questioning, etc.

After this discussion of what are presumably the most important causes of the notorious inadequacy of children's reports we come to the educationally important question: whether and how the child's ability to report can be improved; whether, that is, a training in giving reports is possible, and by what means such a training would be carried out. This question, too, has repeatedly been investigated experimentally.<sup>3</sup> It seems to me that the results of these researches show, in agreement with the theory stated above, that a training in

<sup>3</sup>Reports about physical demonstrations (with special reference to the question of training in reporting) in (1) and (5).

giving reports is possible—but possible only when one can direct the child's attention to those details of an experience that seem to the adult the essential ones. In other words, the training in giving reports must imitate and accelerate the process that otherwise mere increasing years and the accompanying accumulation of daily experience brings about—the transformation of the child's distribution of attention to one corresponding to that of the adult. Several methods for accomplishing this training are conceivable. For one thing, one might use the report-experiment itself as a means of training.<sup>4</sup> From the questions that are asked in this the child gradually learns what details he must notice. Such a training in reporting might easily be added as memory instruction to the usual instruction in observation. The only difference would lie in the fact that the objects would be described by the child not during preception, but after they had been shown to him and then taken away. Moreover, the instruction in observation itself may be used as a training in reporting, in that during the child's very perception of the object his attention may be called to the "essential" details and concentrated on just those details.

Further, a second very essential factor in a child's report can be influenced by memory-instruction. By calling the child's attention to his misstatements one teaches him to take a critical attitude toward his own report. In this way he learns—more quickly than he would learn through ordinary experience—that gaps in his memory may not be filled in at his own sweet will; that all material for the filling in that is furnished by fancy, custom or suggestion must first be tested as to its agreement with the actual experience reported; finally, that if all the material that comes to mind for filling in the gaps fails to stand the test of a thorough criticism, the answer "I don't know" is to be preferred to every doubtful answer.

<sup>4</sup>For an experimental study, showing the nature of the improvement due to such training, see W. S. FOSTER. *The Effect of Practice Upon Visualizing and Upon the Reproduction of Visual Impressions*. THIS JOURNAL, Vol. II, No. 1, January, 1911, pp. 11-22.—EDITORS.



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## FURTHER WORK ON NUMERICAL ACCURACY IN SCHOOL CHILDREN. DOES IMPROVEMENT IN NUMERICAL ACCURACY TRANSFER?

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### SUMMARY.

A class of 72 boys, with an average age of slightly over ten years, was divided into two equal groups on the basis of the pupils' ability in arithmetical reasoning. One group was given ten practice exercises in numerical computation, while the other was occupied with drawing. Both groups were then tested with the same problems in arithmetical reasoning, the pupils solving the problems rationally, but not working them out numerically. There was marked improvement in computation, but no evidence of the transfer of this improvement to arithmetical reasoning.

### I. THE PROBLEM STATED.

In a previous piece of work dealing with this subject\* I endeavored to discover whether improvement in accuracy of numerical computation gave any transfer effect to accuracy of arithmetical reasoning. The results were somewhat doubtful. No regular and constant improvement in the accuracy of arithmetical reasoning followed upon improvement in the accuracy of numerical computation, even though the improvement in the latter was very large. But there were indications in three out of the four schools in which the experiments were made that a majority of the members of the groups which showed large practice effects in numerical computation did somewhat better work in arithmetical reasoning than the groups not practiced. I ventured the hypothesis that this might be due to a release of mental energy which could be devoted to the rational solution of the problems. I suggested that this release might arise from the superior facility attained by the practiced groups in the purely computational part of the

\*See this JOURNAL, Vol. I, No. 10, December, 1910, pp. 557-589.

work. Both the preliminary and final tests in arithmetical reasoning were worked out in numerical results, though the accuracy of the rational steps in the process was, of course, the only consideration for which marks for reasoning were given. It seemed to me that a change of method was desirable. If the arithmetical problems were *not worked out numerically, and yet solved rationally*, we should have a better means for testing the transfer (if any) of improvement in numerical accuracy to accuracy in arithmetical reasoning, and a safer basis from which to calculate correlations. The following research, therefore, is a continuation of the one already referred to, with one considerable modification in method and a few minor ones, all of which will appear in the detailed account which follows.

## II. THE EXPERIMENT.

1. *General plan.* The experiment was carried out in a municipal boys' school situated in a rather poor neighborhood in London. The work was done with the whole of a large class of boys, 72 in number, of an average age of 10 years 3 months, on July 31, 1910. They were almost at the end of their Standard III year when the experiment began. The class was divided into two equal groups on the results of six preliminary tests in arithmetical reasoning. One of the groups was subsequently practiced in arithmetical computation, whilst the other group practiced drawing. After 10 practice exercises had been given, the two groups were put together again and worked six final tests in arithmetical reasoning. No other arithmetical work than that which is here recorded was done by either group during the time the experiment lasted, and the school curriculum of all the pupils in both groups other than in arithmetic was precisely the same. A comparison of the results of the final tests in arithmetical reasoning for Group A and Group B may indicate whether the improvement in numerical accuracy shown by the practiced group is or is not transferred to accuracy in arithmetical reasoning.

2. *Chronology of the tests and exercises.* Six preliminary tests in arithmetical reasoning were given on Thursdays and Tuesdays, June 30, July 5, 7, 12, 14 and 19 from 9.55 to 10.25 in the morning, following immediately after Scripture lesson.

On the results of this work the class was divided into two equal groups. The summer vacation, lasting rather more than a month, now intervened. When the school reassembled one of the two groups—Group A, hereafter called the practiced group—worked 10 exercises in rule sums for the purpose of producing an improvement in accuracy of numerical computation. The other group—Group B, the non-practiced group—worked exercises in drawing. All the practice exercises were worked from 9.55 to 10.25 in the mornings, following immediately after Scripture lesson. The exercises were given on successive school days, on August 25, 26, 29, 30, 31; September 1, 2, 5, 6 and 7. It is common in elementary schools to work rule sums at least once a day, though new forms of arithmetical problems would not be taught on successive days; otherwise, I should have insisted on a larger interval between the successive practice exercises. It would be an interesting and valuable research to determine just what that interval between lessons is that which produces maximum improvement, even for work of this mechanical kind. The question is most probably not to be solved by a mere application of the Rule of Three, namely, the more exercises in a given time, the more improvement. After the practice exercises were completed the two groups were put together again, and worked six final tests in arithmetical reasoning. The work was done on Thursdays and Tuesdays, as before, and at the same time of day as all the previous tests and exercises. The tests were given on September 8, 13, 15, 20, 22 and 27.

3. *Tests and exercises with method of marking.* The following is the first of the tests in arithmetical reasoning:

1. Five books each contain 419 pages. How many pages are there in all the books?

2. I have 2000 marbles. I give 59 to each of 18 boys. How many have I left?

3. If 24 pounds of bacon cost 18 s., and 16 pounds of sugar cost 5 s. 4 d., how much more is the bacon per pound than the sugar?

4. A farmer sold three horses at £27 10 s., £31 19 s. 6 d. and £29 5 s. 6 d. With the money he bought two cows at £14 1 s. 6 d. each and 12 calves. What did each calf cost?

5. Sixty-eight yards of silk were bought at 5 s. 8 d. a yard; 39 yards of it were sold at 7 s. 6 d. a yard. What price must the remainder be sold at per yard so that there may be neither gain nor loss?

Teachers and others who are accustomed to analyze the mental processes of children will see that No. 1 is a "one-step" problem, No. 2 is a "two-step" problem, No. 3 has three steps, No. 4 has four steps and No. 5 has five steps. Before the test series began preliminary exercises were given to the boys in which they were required, not, as in the usual school exercise, to find numerical solutions for arithmetical problems, but to write down *how they would solve them*. They were encouraged and helped to express themselves, and any statement was accepted which gave a true method, or any part of it, however imperfect the verbal expression, spelling or grammar. When they had acquired confidence in this work the series of tests was begun. May I say that, quite apart from its use in helping us to solve this question of the relationship between different forms of accuracy, teachers will find this a valuable form of scholastic exercise, and examiners will be able, by means of it, rapidly and easily to obtain a measure of a candidate's power to solve (in so far as correct method goes) a considerable number of various forms of arithmetical problems.

The second set of problems in the preliminary tests was also arranged so that the first sum was a one-step problem, the second a two-step problem, and so on. Similar precautions were taken with the other sets. Each set of problems, therefore, carried a maximum mark of 15.

A specimen practice exercise in rule sums follows:

1. Add £14 11 s. 9¼ d., £16 2 s. 8½ d., £3 12 s. 7¾ d., £41 2 s. 8½ d., 3 s. 4¾ d.
2. From £79 11 s. 11½ d. take £29 14 s. 11¾ d.
3. £9 8 s. 7½ d.  $\times$  9.
4. £96 14 s. 4½ d.  $\div$  5.

5. Add £27 13 s.  $7\frac{3}{4}$  d., £24 5 s.  $4\frac{1}{4}$  d., £8 19 s.  $4\frac{1}{2}$  d. £26 3 s.  $5\frac{1}{4}$  d., 6 s.  $0\frac{1}{2}$  d.
6. From £86 0 s.  $0\frac{1}{4}$  d. take £25 12 s.  $4\frac{1}{2}$  d.
7. £12 14 s.  $11\frac{3}{4}$  d.  $\times$  6.
8. £85 16 s.  $7\frac{3}{4}$  d.  $\div$  7.
9. Add £2 15 s.  $3\frac{3}{4}$  d., £52 17 s.  $6\frac{1}{2}$  d., £36 4 s.  $1\frac{3}{4}$  d., £11 5 s.  $8\frac{1}{2}$  d., 7 s.  $8\frac{1}{2}$  d.
10. From £94 2 s.  $8\frac{1}{2}$  d. take £28 15 s.  $7\frac{3}{4}$  d.
11. £7 4 s.  $7\frac{1}{4}$  d.  $\times$  12.
12. £76 12 s.  $11\frac{1}{2}$  d.  $\div$  12.
13. Add £17 15 s.  $8\frac{1}{2}$  d., £2 11 s.  $10\frac{3}{4}$  d., 19 s.  $7\frac{3}{4}$  d., £24 1 s.,  $10\frac{1}{2}$  d., £48 12 s. 0 d.
14. From £51 17 s.  $8\frac{1}{2}$  d. take £26 11 s.  $9\frac{1}{4}$  d.
15. £18 6 s.  $4\frac{3}{4}$  d.  $\times$  5.
16. £94 18 s.  $8\frac{3}{4}$  d.  $\div$  8.

The length of the exercise was so arranged, it was thought, that no boy could do all the work in the time, but by the seventh exercise it was necessary to add one more sum, and by the tenth two more. In marking the answers the units taken were the individual processes in addition, subtraction, multiplication and division. It took some weeks to mark the papers in this way, and the exercises followed each other day by day; but the interest of the boys was maintained by the rough and ready method of telling them after each exercise how many sums they had got right. By the method adopted for research purposes errors were not made cumulative. If a boy made an error, it was marked as an error, but was not held to involve other errors necessarily. His error was accepted and his sum worked through from that point to see if he had really made any more errors. The boys who did the exercises in drawing were also informed how many marks they got for each exercise, but the method of marking, like the mere marking of sums right or wrong, was not refined enough to enable me to use the results for correlation purposes with any confidence.

Special care was taken in framing the final tests in arithmetical reasoning, which were to be worked out after the prac-

tice exercises were completed. It was thought at first that the tests given in the preliminary series might be given again. But such a course would possibly have placed a premium on the work of pupils who possessed highly developed rote memories, so it was not adopted. There was a way to repeat the problem without running into this danger. The "principle" of each problem could be exactly duplicated, whilst the names and numbers could be changed. This was accordingly done.

Problem 1 of the first set of final tests became—

If four trees each contain 357 apples, how many apples are there on all the trees?

Problem 2 became—

I have 3165 cherries. I give 72 to each of 21 girls. How many have I left?

Similar duplications were made with the second set of preliminary problems, with the third, and so on.

In so far as the rational steps for the solutions are concerned, the six final tests were identical with the six preliminary tests; Test 1 corresponding to Test 1 of the preliminary, and so on. The maximal mark for each of the 12 tests was, therefore, the same; namely, 15.

### III. RESULTS.

Seventy-two boys commenced the experiment, but some boys left the school during its course, and some were absent for long periods, so that the number finally available was 64. I will give first the division of the class into two equal groups, based on the results of the six preliminary tests in arithmetical reasoning.

TABLE I. *Showing the Average Marks in the Preliminary Tests for Groups A and B, Section by Section.*

Marks for 6 prely. tests in arithmetical reasoning.	No. of boys.	GROUP A.						Totals.
		Test 1.	Test 2.	Test 3.	Test 4.	Test 5.	Test 6.	
Over 60.....	5	10.0	10.6	13.2	13.4	13.0	12.8	72.8
Over 50.....	5	7.0	8.6	9.4	11.2	7.8	10.6	54.6
Over 40.....	5	7.0	7.6	8.4	8.8	6.8	7.2	45.8
Over 30.....	7	4.7	4.9	6.7	7.9	5.3	5.7	35.1
Over 20.....	7	3.3	4.3	5.7	6.4	4.7	3.0	27.4
Under 20.....	3	2.7	1.7	3.0	2.0	3.0	2.7	15.0

Marks for 6 prely. tests in arithmetical reasoning.	No. of boys.	GROUP B.						Totals.
		Test 1.	Test 2.	Test 3.	Test 4.	Test 5.	Test 6.	
Over 60.....	5	10.8	11.6	13.0	13.4	11.6	13.0	73.4
Over 50.....	5	8.4	8.8	9.4	11.0	7.2	9.0	53.8
Over 40.....	6	6.0	7.7	7.5	10.2	6.7	7.3	45.3
Over 30.....	6	5.3	6.5	5.7	8.1	4.8	3.5	34.0
Over 20.....	7	3.9	5.0	4.6	5.1	4.6	4.1	27.3
Under 20.....	3	3.0	2.7	3.0	2.0	1.3	1.7	13.7

I will next show the relationship between the results of the preliminary reasoning tests and of the numerical accuracy in the practice exercises in computation for, of course, the practiced group only.

TABLE II. *Showing the Relation Between Accuracy of Arithmetical Reasoning and Accuracy of Numerical Computation.*

Marks for 6 prely. tests in reasoning.	No. of boys.	Average mark per boy	
		in arithmetical reasoning.	for 10 practice exercises in numeri- cal computation.
Over 60.....	5	73.4	2123.0
Over 50.....	6	53.8	1750.0
Over 40.....	6	45.3	1693.5
Over 30.....	6	34.0	1269.8
Over 20.....	7	27.3	1272.4
Under 20.....	3	13.7	877.3

It is obvious that the correlation is highly positive; that is, that the boys most accurate in arithmetical reasoning are, generally speaking, the boys who are most accurate in numerical computation. Such a table, however, gives no numerical coefficient of correlation. This was worked out from the individual cases by means of the Pearson formula, " $r$ " =  $\frac{\sum xy}{\eta\sigma_1\sigma_2}$ , and " $r$ "

was found to be + .736, with a probable error of .054.

I will next show the improvement made within the practice medium itself. I propose to measure this by considering the average mark for his first and second practice exercises as the initial position of each pupil, and the average mark for his ninth and tenth practice exercises as his final position. The difference between them will be regarded as a measure of the practice effect.



TABLE III. *Showing the Improvement of Group B in Numerical Accuracy, Section by Section.*

Marks for 6 prely. tests in reasoning.	No. of boys.	Average mark for 1st and 2d exercises in numerical accuracy.	Average mark for 9th and 10th exercises in numerical accuracy.	Percentage Improvement.
Over 60.....	5	362.4	512.6	41.4%
Over 50.....	5	268.4	461.2	71.8%
Over 40.....	6	291.0	422.3	45.1%
Over 30.....	6	222.5	302.2	35.8%
Over 20.....	7	217.3	311.6	43.4%
Under 20.....	3	172.7	215.3	24.7%

Working from the individual cases, 3 are found to show an improvement of 80 per cent. and over, 3 of from 60 to 80 per cent., 13 of from 40 to 60 per cent., 9 of from 20 to 40 per cent., 2 of from 0 to 20 per cent., and in two cases a decrease is shown.

The improvement is thus very considerable, amounting to over 40 per cent. in the 10 days' practice. I attribute some of this improvement to the fact of the commencement of the series shortly after a considerable holiday. The boys, therefore, began somewhat below their normal level.

It now remains to show how much (if any) of the improvement in the accuracy of numerical computation is transferred to the accuracy of arithmetical reasoning. The classification into sections is based on the marks obtained in the preliminary tests in arithmetical reasoning.

TABLE IV. *Showing the Average Results of the Final Tests in Reasoning with Groups A and B, Section by Section.*

Marks for 6 prely. tests in arithmetical reasoning.	No. of boys.	GROUP A.						Totals.
		Test 1.	Test 2.	Test 3.	Test 4.	Test 5.	Test 6.	
Over 60.....	5	10.6	12.2	12.4	13.4	11.0	13.2	72.8
Over 50.....	5	7.8	9.6	11.4	11.0	7.8	12.2	59.8
Over 40.....	5	5.6	7.8	8.4	10.4	6.4	9.8	48.4
Over 30.....	7	4.1	6.7	6.0	8.7	6.0	5.1	36.7
Over 20.....	7	4.0	6.3	5.4	7.3	5.0	4.9	32.9
Under 20.....	3	3.7	4.0	3.3	4.7	4.0	4.0	23.7

Marks for 6 prely. tests in arithmetical reasoning.	No. of boys.	GROUP B.						Totals.
		Test 1.	Test 2.	Test 3.	Test 4.	Test 5.	Test 6.	
Over 60.....	5	11.8	11.8	13.6	13.6	13.6	14.8	79.2
Over 50.....	5	7.2	9.2	9.0	10.0	7.4	10.2	53.0
Over 40.....	6	6.5	9.3	8.3	10.7	7.5	11.3	53.7
Over 30.....	6	5.7	5.3	5.2	6.2	5.2	4.8	32.3
Over 20.....	7	4.3	6.1	5.4	6.7	4.6	4.9	32.0
Under 20.....	3	2.0	3.7	1.7	4.0	2.7	2.3	16.3

A more condensed method of showing the comparative results of Groups A and B in the preliminary and final tests is given in the next table.

TABLE V. *Showing the Average Results of Groups A and B, Compared Section by Section, in the Preliminary and Final Tests.*

Marks for prely. tests.	No. of boys.	GROUP A.		No. of boys.	GROUP B.	
		Av. mark preliminary tests.	Av. mark final tests.		Av. mark preliminary tests.	Av. mark final tests.
Over 60...	5	72.8	72.8	5	73.4	79.2
Over 50...	5	54.6	59.8	5	53.8	53.0
Over 40...	5	45.8	48.4	6	45.3	53.7
Over 30...	7	35.1	36.7	6	34.0	32.3
Over 20...	7	27.4	32.9	7	27.3	32.0
Under 20..	3	15.0	23.7	3	13.7	16.0

Taking the groups as wholes, and working from the individual figures, we find that Group A—the non-practiced group—obtained an average score of 42.2 marks in the preliminary tests, with a mean variation of 14.6, and Group B obtained an average score of 42.0, with a mean variation of 14.8. In the final tests Group A scored an average of 45.7 (mean variation 14.2), and Group B an average of 45.3 (mean variation 16.4). Or presenting the results in corresponding tests for preliminary and final work, respectively, and remembering that 15 is the maximum mark for each test, and that each number is the average of 32 cases, we again see the extraordinary similarity between the work of the two groups.

TABLE VI. *Showing the Average Marks for Reasoning of Groups A and B Compared, Test by Test.*

	Preliminary tests.						Final tests.					
	1st	2d	3d	4th	5th	6th	1st	2d	3d	4th	5th	6th
Group A.....	5.8	6.3	7.8	8.5	6.8	6.9	5.9	7.8	7.8	9.4	6.7	8.1
Group B.....	6.3	7.2	7.3	8.6	6.2	6.5	6.4	7.7	7.4	8.7	6.9	8.2

## V. SUMMARIZED CONCLUSIONS.

1. The great improvement in accuracy of arithmetical computation seems to have produced no improvement whatever in the accuracy of arithmetical reasoning.

2. Both groups show a slight improvement in arithmetical reasoning, an improvement which is found to be practically equal in the two groups. The significance of this for experi-

mental work with school children is considerable. The assumption which is made by the method of equal groups is as follows: *With equal groups of the same grades or class, and approximately of the same age, the growth effects in the mental function in relation to which the division is made are practically identical, at least for short periods.* The assumption for groups of this size appears in this case to be corroborated by the results.

3. There exists high positive correlation between the two functions, numerical computation and arithmetical reasoning. This high correlation does not appear to involve such a community of function that improvement in the one operation involves improvement in the other.

## COMMUNICATIONS AND DISCUSSIONS.

### STANDARD TESTS IN ARITHMETIC.

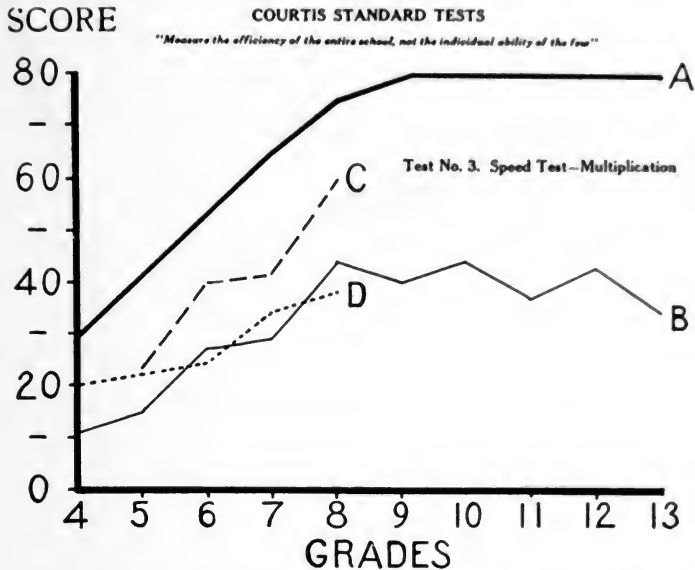
May I announce through the columns of your valued JOURNAL an attempt to determine, through the co-operation of many schools and teachers, "standard" scores in arithmetic.

The writer has for several years been carrying on an extended series of measurements of conditions in arithmetic in the Detroit Home and Day School, for the mathematical courses of which he is responsible. The results of these investigations have been published elsewhere (*Elementary School Teacher*, Vols. 10 and 11), but a brief summary here of two important conclusions will make plain the purpose of the present undertaking.

The first of these is that grade work, as conducted in the past, has been very inefficient. The range of variation in the classes has been so extreme that in some cases all levels of ability, from those of the primary grades to that of the senior class in the high school department, have been found in a single grade. And the use of the same tests by other schools makes its possible to say at this time that such conditions are quite general.

The second conclusion is that the cause of the variation is to be found in the extreme specialization of the children, either by heredity or previous training, so that work exactly suited to the needs of one individual produces on another scarcely any effect at all. Apparently it is possible for one child under given conditions to learn the multiplication tables readily, but to have great trouble with the addition combinations; for another to master addition without difficulty, but to fail in division; while a third member of the same class may be unable to remember particular combinations in all the tables.

In view of these facts it seemed advisable to set for each grade a "standard" score, and to attempt to remedy, by *extra work* with the individual, the deficiencies revealed by the testing work. In the figure, Curve A represents such standard scores for the multiplication tables, while Curve B shows the actual scores made by the various grades in September. The results of the first two months' work is shown in Curve C, while D gives the record of a school of good standards in another city tested the same week in October. The difference between Curves A and B represents the improvement that will have been made when grade averages reach "standard" conditions.



The question naturally arises, "How reliable are these standard scores?" The answer is that they have been determined with care, but are based upon the evidence from a single school. Accordingly, the writer is distributing among those known to be interested in such work ten thousand sets of the tests. These will be given under uniform conditions and the results returned for tabulation as one large group. Seven thousand of these have already been placed and the remainder will be reserved mainly for the South and West. If teachers and principals in these sections of the country, willing to aid in this work, will send their names to the address below, full information in regard to the undertaking will be promptly returned.

The writer regrets exceedingly that the resources at his disposal for this purpose will limit the free distribution of the tests to the number indicated above. There must be many teachers and principals who would be glad to share in such work, and it has been decided to supply *at cost* all who will agree to follow the printed instructions and contribute their results for the general purposes of the investigation. In this way the number of individual measures, and the value of the results, will be largely increased.

One further word of explanation is necessary. The Curtis Standard Tests to be used in this investigation are not "examinations" to find out how much the individual knows, but carefully constructed.

scientific measures of the fundamental abilities in arithmetic involved in simple work with small whole numbers. The results show the efficiency of the school *as a whole*. Detailed instructions for giving the tests and for scoring the papers have been printed in the form of convenient folders to put in the hands of each examiner and scorer in order that the valuation of the results may be rigidly uniform. It is this feature of the tests—the elaborate provision for uniform conditions through instructions, record sheets, answer cards, special methods of computations, etc.—that makes testing on so large a scale a possibility. While it is too soon to announce definite plans, it is probable that exactly the same tests will be printed and given in Germany. Negotiations are also under way with teachers in England, France and Switzerland. The final results, therefore, could easily prove of lasting value, and it is hoped that many teachers in our own country will respond to this invitation.

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#### THE RECALL OF NONSENSE SYLLABLES AGAIN.

The "Notes on the Recall of Nonsense Syllables," contributed by Dr. Whipple in this JOURNAL, September, 1910, bring to my mind a similar recall in my own experience, but covering a greater lapse of time.

In the fall of the year 1886 it was my painful task to study Latin. My method was that of assimilation rather than the required learning of rules. One day, after having confessed ignorance of a certain rule with reference to the formation of ablatives of monosyllabic nouns of the third declension, I was kept after school hours until I had learned it. Following the rule was a list of exceptions which were to me the equivalent of nonsense syllables. Twenty-three years later, no reference having been made to that rule in the meantime, I took up the study of German. An early rule to be learned included a list of prepositions. Upon repeating this list, there immediately entered my mind the exceptions to my old rule in Latin: *ux, pax, pix, cor, cos, ros, sal, sol, lux*. I must confess, however, that the wording of the rule to which these are the exceptions is past recall.

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## ABSTRACTS AND REVIEWS.

GEORGE V. N. DEARBORN. *Moto-Sensory Development: Observations on the First Three Years of a Child*. Baltimore: Warwick & York, Inc., 1910. Pp. 215. \$1.50.

If one happens to know that the author of this monograph is trained both in psychology and physiology—Dr. Dearborn is at present professor of physiology in the Tufts College medical schools—one takes it up with the expectation of finding a distinct contribution to the literature of infant behavior, and also a discriminating appreciation of the work of earlier students in that field. And in this one is not disappointed; the book abounds in effective criticisms of previously published work and in observational and interpretative matter of the first rank.

The book is made up, in about equal parts, of (1) careful observations—transcripts, presumably, from the author's diary—of the first three years of a child's motor and sensory development; (2) notes, suggestions, theoretic discussions and comparisons of the author's observations with those of Preyer, Darwin, Shinn, Moore and others.

The author's general plan, in the main body of the book, is to record the day's observations, then to compare these with those of other writers, adding, in many instances, comments, criticisms, interpretative notes pertaining to or suggested by the record. This part of the work devotes 132 pages to the first year, 54 to the second and 8 to the third. The relative importance of each of the three years studied, as regards moto-sensory development, is indicated fairly well by the amount of space given to each year.

Then follows a series of "Inductions," for which, however, the author does not claim universal validity. Three or four of them may be quoted: (1) Inhibition is a fundamental function obviously fully developed at birth; (2) the inherently inhibitory nature of attention is in evidence even from the first day of "life;" (3) imitation is the method-basis of the greater part of advancement in voluntary development; (4) the evidence goes to support the genetic theory of the conception of space, time and causality.

Next we have a "Chronologic Epitome (by weeks) of the Observed Development." The value of this section would be much greater if the author had stated the principle or principles which guided in its preparation. As it stands, it is not always obvious whether a given piece of behavior is assigned to a given week because it first appears in that week, or is characteristic of it, or is its most conspicuous, striking feature.

For the casual reader probably the most interesting feature of the book is the "Alphabetical Arrangement of Various First Appearances," some 260 of which are listed. Among them one notes—Association of an object and its name, 240th day; voluntary calling of a person, 327th day; conception of tomorrowness, 784th day; discrimination of red from green, 183d day; drawing, 214th day; recollection of dreaming, 712th day; eyes follow light reflexly, 13th day; fear of dark, 176th day; voluntary grasping, 123d day; imitation, voluntary, of hand-waving, 194th day; jealous, 368th day; memory-image, 18th day; stereognostic perception, 715th day; pupillary reaction to light, 45th day; sensibility to ridicule, 214th day; sitting up unassisted, 170th day; talking in sleep, 493d day; tears, 48th day; spontaneous use of "I," 770th day; winking reflexly from threatening movement, 123d day. The author recommends that this Alphabetical List of First Appearances be used as an accessory index.

The particular form in which a scientist shall cast his observations and his interpretations thereof still remains largely a matter of individual preference; and in reference to the accounts of infant development and behavior, in particular, we can hardly maintain that there are any standards whereby the literary form of a treatise in this field may be measured. And yet the writer of this notice ventures to doubt that the present monograph is altogether fortunate in its composition. One's first impression on opening its pages is likely to be unfavorable; they look too formidable to entice any but the most hardened. Still the table of "First Appearances," the series of "Inductions," and the full index will, if they are discovered in time, do much toward allaying first fears and toward securing for the book the wide reading it deserves.

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CHARLES S. MYERS, M. D., Sc. D. *The Pitfalls of "Mental Tests."*  
Pp. 8. (Reprinted from British Medical Journal, January 29,  
1911.)

Myers contends, first, that psychology in England is in danger from popularization, in so far as the notion is gaining acceptance that "no special course of training is necessary in order to conduct on a large scale investigations of a psychological nature;" secondly, that no useful psychological purpose can be served by collecting masses of data with the help of an army of untrained experimenters, since vast numbers of poor measurements do not yield valid results by the cancelling out of inaccuracies and inconsistencies; thirdly, that it is impossible and undesirable as yet to standardize mental tests; fourthly, that in psychology we can ascertain what we are testing only by recourse to introspection on the part of the subject; and fifthly, that unless the underlying conditions and factors are analyzed the blind application of tests to complex problems affords only a blurred or erroneous result.

We do not suppose that any one will dissent seriously from these statements in so far as they urge the necessity of training in the conduct of tests and of analyzing the problems to which the tests are applied. Conditions in this country are, fortunately, not quite so much open to criticism: there are numerous institutions, universities, colleges and normal schools as well in which are offered systematic drill courses in the conduct of psychological experiments, including the conduct of mental tests. We cannot, therefore, acquiesce in Myers' contention that a standardization of mental tests is impossible and undesirable; the work of the Committee on Mental Tests of the Psychological Association, the manuals of Seashore, Whipple and others, and the general interest that they have awakened is evidence that mental tests can be standardized, and should be standardized. To standardize a mental test does not mean that the test in question will never be discarded or improved upon; it means simply that experts select and recommend the most feasible materials and methods for conducting the test, in the hope of unifying methods and rendering more comparable the data secured by different experimenters.

Finally, we must dissent from the implication that no mental test is of real psychological value unless accompanied by introspection on the part of the subject. We are perfectly willing to admit that

many quantitative and statistical experiments need the corrective of expert introspection, but there remain many forms of test, notably those applied so freely to the study of school children, in which real introspection is out of the question. Myers says that these tests are "tests of production," not "mental tests." He means, as we understand him, that no test of functional efficiency is a mental test or a psychological experiment, that any test of *how much* or *how well* is *ipso facto* outside the realm of psychology. Perhaps Dr. Myers will find it necessary to enlarge his concept of psychology.

CORNELIUS HOOD.

C. E. SEASHORE. *The Measurement of Pitch Discrimination: A Preliminary Report.* The Psychological Review Monographs, No. 53.

The report gives first a general account of apparatus, making specific recommendation with reference to such factors in apparatus as reliability, availability, the tonal register, increments, sounding, timbre, resonance and danger of identification, and then rejects certain instruments and makes specific recommendations of other instruments and gives directions for tuning. The apparatus recommended consists of a set of twelve tuning forks, to be known as "the standard pitch discrimination set," and a Koenig adjustable resonator. Two grades of forks are recommended, one high grade set costing \$34, and one cheaper, costing \$12 untuned. The resonator costs about \$6.50.

Then certain precautions to be observed in the test are discussed with reference to apparatus, such as temperature, position of the blow, force of the blow, the sounder, adaptation period, the resonator and testing the forks; and with reference to procedure, such as intensity, duration, time interval, order, uniformity, attention, the charge and the judgment.

Types of tests are classified and specific directions are given with reference to procedure in each type of test. Then follows a section on interpretation of results considering (1) the normal curve, the comparison of pitch discrimination with other sensory discrimination, and extreme cases in the distribution of the records of the group; (2) reliability as shown in the mean variation, internal evidence and notes, "final" test, proportionality of increments, relative central values, the cognitive *versus* the physiological threshold, and the illusion of difference; (3) the normal curve for the tonal register;

(4) correlation of pitch discrimination with other possible factors in "musical ability;" (5) significance of practice, age and sex; (6) the practical use of these measurements in the psychological laboratory, in the school-room and in the studio; and finally there is a section on some general cautions.

The report is the result of several years of co-operation on the part of a number of people. No one can afford to undertake experiments in pitch discrimination without first consulting this report of the committee of the American Psychological Association on the standardizing of the procedure of experimental tests.

AUTHOR'S ABSTRACT.

A. BAUR. *Die Hygiene geistiger Arbeit der Schüler und Lehrer.*  
Internationales Archiv für Schulhygiene, 7: January, 1911,  
52-92.

In this interesting contribution Dr. Baur reports new results obtained from his method of measuring fatigue in terms of the range of accommodation of the eye. (For former reports, see his *Ermüddungsmessungen nach Sanatogengenuss*, Gesundheitswarte, 1909). The principle involved is that physical or mental fatigue is reflected in muscular fatigue, or in neuro-muscular fatigue, that, in particular, the very sensitive muscle of accommodation, on account of its close connection with the brain, reflects the condition of that organ more quickly and accurately than does any other muscle or sense-organ. The determination of the range of accommodation is made very rapidly and easily by a modification of Scheiner's experiment. The subject looks through an ocular, divided vertically into a semi-circle of red and a semi-circle of green glass, at the movable needle, behind which a white background is arranged. So long as the needle is within the range of accommodation it shows white; when without the range it shows red and green margins. Lengthening of the range of accommodation, *i. e.*, the minimum distance from the eye to the object compatible with clear vision, indicates weakening of the muscle, and hence a condition of fatigue.

Baur claims for this method ease of application, accuracy, delicacy and freedom from auto-suggestion. The use of the eye for long-continued reading does not interfere with the test, because this effect soon passes off when the eye is at rest.

The article is accompanied by numerous tables and graphs as well

as by photographic illustrations of the experiment itself. In conclusion, Baur outlines some of the practical problems in the hygiene of work and fatigue that need investigation. His measurements "clearly point to the conclusion that the hygiene of every kind of mental work depends on the economizing of mental expenditure, the reduction of the amount of work, the simplification of the work-material, the proper amount of recreation, the preservation of bodily health and the creation of a favorable environment in the school and the home, with special regard to the maintenance of favorable emotional conditions."

CORNELIUS HOOD.

HORACE A. HOLLISTER, A.M. High School Visitor for the University of Illinois. *High School Administration*. Boston: D. C. Heath & Co., 1909. Pp. xi, 379.

JOHN FRANKLIN BROWN, Ph.D. Formerly Professor in Education and Inspector of High Schools for the State University of Iowa. *The American High School*. New York: The Macmillan Company, 1909. Pp. xii, 462. \$1.40 net.

These two books are essentially similar. The authors attempt to set forth the specific character of the American secondary school—its place and function in the public school system, its special problems, and its prospects. How nearly identical the books are, in subject matter, may be seen from the following summary of topics common to both: historical sketch of secondary education, the function of the high school, material equipment, program of studies, organization of instruction, teachers and teaching, methodology, supervision, characteristics of high school pupils, discipline, the school as an organism, the relation of the high school and the community, future development. There are differences in terminology and in arrangement, emphasis and detail; but the subject matter is indicated in all essentials by the preceding summary. In addition to these, Professor Hollister, whose book is more extensive than Dr. Brown's, has chapters on the legal status of the high school and on moral and religious training. These topics are treated only cursorily in the companion volume. The books are further similar in that both authors approach their subject from the point of view of university inspectors of state high schools. They necessarily have a slant towards the status, problems and needs of the smaller

than towards the city high school. Certain in treatment resulting therefrom are common

not fail to prove useful. There is no teacher, high school officer, who will not find much in each ally useful or suggestive. To the inexperienced either will be a valuable handbook. The horizon out narrow teacher should be perceptibly broad- of either book. The widely experienced high r will find suggestive sidelights.

products of the experience of university teachers doubtless intended for use as text books for uni- secondary education. They are only moderately capacity. They have not sufficient grasp and satisfactory text books. They lack the note of two, Professor Hollister's book is the better. It erial, and is more systematic, thorough and sub- more, each chapter is supplemented by a list of "other Investigation." In general, these additional it and significant.

ects are such as might be expected from the general above, *i. e.*, the lack of vigorous and authoritative in chapters give one the feeling one experiences sight-seeing automobile under the ministrations of learned his "piece," but who cannot be safely ques- es of this are Chapters III and X in Brown, and l V in Hollister. Similarly, there are paragraphs t are feeble or inconsequential. For example, Hol- ) talks about the importance of good text-books. ls authoritatively what a good text-book is; and tes that text-books "should be very clearly printed."

but does not anywhere specify the requirements. Occasionally there is something that is hopelessly wrong. For instance, the following quotation from Brown (p. 179) "where the study hall is very large, seating 1000 or more, the problem of discipline in it may become a serious matter; but even in such cases it is cheaper and better to provide the necessary teachers to care for the room than to provide equally good opportunities for study in some other way." The method endorsed is neither cheaper nor better; and from the point of view of mental economy it is viciously wasteful.

Both books are supplied with bibliographies, indexes and appen-

dixes. In neither case is the bibliography general; lists of references follow each chapter. Other than this, there is no topical arrangement of references. This is a defect, especially from the text-book point of view. The references in Dr. Brown's book are much more copious than in Professor Hollister's, and publisher and date of publication are specified in each case. These are lacking in Hollister. On the other hand, the latter has carefully selected his references. A good index is an essential part of a useful book. In this respect Dr. Brown's book is superior. The appendixes consist largely of samples of high school programs and similar illustrative matter. Those in Hollister are more valuable.

W. S. SMALL.

Principal, Eastern High School, Washington, D. C.

WILLIAM CARL RUEDIGER, PH.D., Assistant Professor of Educational Psychology in the Teachers College of George Washington University, Washington, D. C. *The Principles of Education*. Boston: Houghton Mifflin Company, 1910. Pp. 305.

In the words of the author, "the book attempts to bring together and organize the leading tendencies in modern educational thought pertaining to the bases, aims, values and essential content of education; to discuss the principles underlying the administration of the curriculum; to inquire into the agencies that educate, and to review the fundamental psychological principles that underlie the teaching process." Most of the book is devoted to a discussion of educational aims and values, and of their appliances to the selection and administration of the curriculum.

The author states that "the aim of education may be defined from the biological standpoint as the adjustment of the individual to the life in which he must participate." Following the chapter in defense of this aim, are several chapters giving valuable critical summaries of the more important aims of education elsewhere advocated and the doctrine of formal discipline. The chapters on educational values and the curriculum are a valuable contribution to educational literature on these subjects.

Although the author states that "Education is fundamentally a biological process and is made possible by biological conditions," and defines the aim of education "from the biological standpoint of adjustment," the chapter on "The Biological Bases of Education"

is too brief and limited fully to justify the author's position. This subject deserves more thorough treatment. At the end of the book are appended two chapters on "The Psychological Bases of Education," a topic not included in the author's statement of the content of the principles of education. They are little more than the ordinary discussions of topics in psychology, and do not make clear the principles of education or teaching dependent thereon.

Oswego (N. Y.) State Normal School.

DAVID GIBBS.

CHARLES A. ELLWOOD. *Sociology and Modern Social Problems*. New York: The American Book Company, 1910. Pp. 331.

Professor Ellwood's recent book, *Sociology and Modern Social Problems*, is distinctly an advance. One finds in it more of fact and less of fiction, more science and less theory than one usually sees in works in sociology. We have no right, as a psychologist, to review a book in another field, and shall not attempt it. The reader must go to the journals of sociology for a critical review; but it will not be out of place here to call attention to what the book contains that bears on the problems of the teacher. Besides the final chapter on education and social progress, those of most interest to the teacher are concerned with the family, its origin, historical development, function, forms and problems. The dependence of civilization and its development on the family is carefully worked out, and that the continued development of civilization depends on our maintaining the integrity of the family is made perfectly clear. These are facts that none should know better than the school teacher, in these modern times, when so many dangerous doctrines are put forth.

In his last chapter, Professor Ellwood discusses education and social progress. Education is defined in terms of adjustment; it "exists to adapt individuals to their social life;" its function "is to guide and control the formation of habit and character on the part of the individual, as well as to develop his capacities and powers, so that he will become an efficient member of society." The education of the nineteenth century is criticised as being commercialistic and anti-social; it "aimed at developing largely power and capacity in the individual as such; its implicit, and often its avowed, aim was individual success." This sort of education, we are told, failed to produce the good citizen, and often produced the "cultured freebooter." We should have, Ellwood says, a socialized education.

producing the good citizen before the good lawyer, engineer or physician or any other professional type. This means "good fathers and mothers and good neighbors." In some way or other, our public schools, from the kindergarten up, must make a place for social and ethical instruction. Our higher education should put to the front the ideal, not of individual power and success, but of social service.

The University of Missouri.

W. H. PYLE.

DR. JOS. VATTIER, avocat, membre de la Société de Législation Comparée et de la Ligue du Coin de Terre et due Foyer. *Le Bien de Famille insaisissable*. Préface de M. l'abbé J. Lemire, député du Nord. (Collections de Réformes Sociales). Paris: Librairie Générale de Droit et Jurisprudence, 1910. Pp. xli, 426. 5 fr.

This scholarly work is a study, from an economic, judicial and social point of view, of legislation for the protection of the small land holder. Thanks to the original data collected by the author from most reliable sources, the book contains much interesting information regarding the American "Homestead Laws," the German "Heimstätten," the Swiss "Asiles de Famille," and the Belgian "Bien de Famille." The French institution of the "inalienable family right" (Law of July 12-13, 1909, and Decree of March 26, 1910) is examined in detail and with great legal acumen. The book is enriched by a complete bibliography of the subject of homestead rights, and is presented to the reader by M. Lemire, "the father of the new law." In a word, it is a book which should be read by all who are interested in "Social Reforms."

C. B. DAVENPORT. *Eugenics: The Science of Human Improvement by Better Breeding*. New York: Henry Holt & Co., 1910. Pp. 35. 50 cents.

The first section of this book, entitled "Fit and Unfit Matings," sets forth our present knowledge of inheritance, with particular reference to the cardinal Mendelian principals, independent unit characters, the determiner of the germ-plasm and the segregation of determiners. Brief and clear explanations and illustrations are given of simplex and duplex and of positive and negative characters, and an account is given of the principles governing the inheritance of a number of simple characters, such as eye color, hair color, brachydactyly, imbecility, albinism, deafmutism and hereditary



weakness in certain structures. Tables of family records occupy four pages. The principles thus illustrated are summarized (pp. 24-5) in a number of rules that should govern mating.

The second section of the book, entitled "A Plan for Further work," shows the necessity for further investigation of the facts of human inheritance and for a campaign of enlightenment for the masses through magazine and newspaper articles, public lectures, letters and other avenues for reaching public opinion. When public spirit is once aroused, thinks Davenport, appropriate legislation will follow, and the time will come when society may be freed of the care of the weak and the unfit. Even one-half of 1 per cent. of the \$88,000,000 now spent annually on hospitals, almshouses, prisons and asylums would, if devoted to a campaign for eugenics, make these institutions largely unnecessary. Just now we are so used to these institutions that we take the necessity for them as granted, and do not concern ourselves with the possibilities of their reduction by the scientific application of the principles of eugenics.

W. S. FOSTER.

Cornell University.

FRANK PIERREPONT GRAVES, PH.D. *A History of Education During the Middle Ages and the Transition to Modern Times.* New York: The MacMillan Company, 1910. Pp. xv, 328.

This is a continuation of the author's previous volume, "A History of Education Before the Middle Ages," which has been received with considerable favor. The present volume is not only as good as, but better than, the previous one. Since it covers a period that has heretofore been very inadequately and imperfectly treated by most writers, the work is conspicuous among histories of education as one of the most complete and interesting. It gives many details not found in the larger history of Monroe, but does not perhaps make the great social and educational movements stand out any more clearly. Unusual and deservedly large space is given to the work of Vittorino da Feltre, who is scarcely mentioned by many authors. A clear description of the work of all orders and men who figured at all prominently in education during the period is given. The care that is sometimes taken to make statements as to details historically accurate may possibly divert the attention of students from truths of greater educational significance, yet normal and college students will probably find this a very satisfactory text.

Fitchburg, Mass.

E. A. KIRKPATRICK.

## NOTES AND NEWS.

PROBLEMS IN EXPERIMENTAL PEDAGOGY. In the present issue we publish Mr. Pearson's article on "The Scientific Study of the Teaching of Spelling," which is the first of the series of articles on "Problems in the Experimental Pedagogy of School Subjects," already announced in these columns. The contributors to this series, in so far as arrangements have been completed, will be as follows:

### ELEMENTARY SCHOOL SUBJECTS.

*Spelling*.—MR. HENRY C. PEARSON, Principal Horace Mann School, Teachers College, Columbia University.

*Reading*.—PROFESSOR WALTER F. DEARBORN, University of Chicago.

*Writing*.—DR. FRANK N. FREEMAN, University of Chicago.

*Arithmetic*.—DR. C. W. STONE, Virginia State Normal School.

*Geography*.—PROFESSOR W. W. CHARTERS, University of Missouri.

*Nature Study*.—MR. FREDERICK L. HOLTZ, Brooklyn Training School for Teachers.

*History*.—MR. S. A. COURTIS AND MISS S. HADLEY, Detroit Home and Day School.

*Singing*.—PROFESSOR CHARLES H. FARNSWORTH, Teachers College, Columbia University.

*Drawing*.—PROFESSOR WALTER SARGENT, University of Chicago.

*Vocational Education*.—DR. DAVID SNEDDEN, Massachusetts State Commissioner of Education.

*Agriculture*.—MR. GARLAND A. BRICKER, Ohio State University.

### SECONDARY SCHOOL SUBJECTS.

*Latin*.—MR. JOHN C. KIRTLAND, Phillips Exeter Academy.

*German*.—MR. VALENTIN BUEHNER, Manual Arts High School, Los Angeles, Cal.

*English*.—PROFESSOR HARRY KENDALL BASSETT, University of Wisconsin.

*Physics*.—PROFESSOR C. R. MANN, University of Chicago.

*Biology*.—PROFESSOR MAURICE A. BIGELOW, Teachers College, Columbia University.

*Geometry*.—PROFESSOR WILLIAM H. METZLER, Syracuse University.

Other subjects of the elementary and secondary courses of study will likewise be surveyed by competent authorities, and ultimately we hope to have a fairly complete list. The aim of this series, as indicated in our January announcement, is to stir up interest in the experimental investigation of the problems of teaching by definitely formulating a number of these problems and pointing out promising methods of attack. We hope that the articles will provoke discussion, and that other problems will be suggested and experimental methods outlined. Especially do we invite superintendents, principals and teachers to carry out in their schools the investigations indicated. If such co-operation can be secured, we foresee two important results: First, the collection of a large amount of data on school activities under actual school conditions—data which will be of value for the development of the science of education. Second, the cultivation of a scientific attitude of mind on the part of the teaching staff—of an appreciation for, and an interest in, the problems of education. American teachers are charged with a lack of professional spirit. There is no more effective way of stirring up a corps of teachers and putting life into their work than to get them interested in the study of the problems of teaching, which lie all about them, but to which their eyes are usually closed.

J. C. B.

**THE SUPERNORMAL CHILD: A CORRECTION.** In our editorial in the March issue calling the attention of our readers to Professor Stern's articles on the supernormal child, we quoted the Bureau of Education to the effect that "there are at least 69 cities of over 30,000 population that have special classes for gifted children." Correspondence with the superintendents of these 69 cities has since revealed the fact that only in Baltimore, Worcester, Indianapolis and Cincinnati are such classes in operation.

The Bureau of Education, in explanation of its former statement, assures us that our inquiry for a list of the school systems in which "special provision is being made for pupils of exceptional ability" was interpreted as meaning "children that were not normal in their abilities." The Bureau is of the opinion that the phrase "children of exceptional ability" is "open to grave objections," because "the term 'exceptional children' is used commonly over the country to designate those that are not normal, including those that are above or below." It seems to the Bureau "quite natural, therefore, for the

term 'exceptional ability' to apply to children who are below as well as those that are above the normal."

To construe the "child of exceptional ability" as inclusive of the stupid as well as of the bright child seems to us to be unfortunate, to say the least. But if this interpretation is to be made, some other phrase must be employed. The adjective "supernormal," though valuable as indicating a contrast with the subnormal, carries in the minds of many a suggestion of the abnormal, when the normal is thought of, not as the mean or average condition, but as the sane, healthy or desirable condition. Objections may be raised likewise against the terms "bright child" or "superior child." Perhaps the term "gifted child" may serve a useful purpose.

G. M. W.

"SCIENTIFIC MANAGEMENT" is the watchword of the day. It is going to result in the inventory of processes, instruments and results, the like of which we have never had before. The employer of crude labor is trying out his men, determining by "scientific experiment" the most efficient form and size of a shovel, and securing the sympathetic co-operation of his men; and thereby, it is claimed, he more than doubles the output, raises the status and increases the happiness of the laborer. The same principle will be applied to government functions, to university organization, to railroads, to the manufacturing industries, etc. The most significant thing about this movement for the educational psychologist is that ultimately it all hinges upon the determination of human efficiency and training toward such efficiency; for, the object is not only to get the most efficient work out of an individual, but also to get individuals who know how to determine efficiency, how to determine by scientific experiments the best form of tools, the best processes and the best form of cognition and action, and even the simplest workman is to be trained to do his work in the most efficient way as determined by "scientific experiment." No other issue has ever created such a demand for the application of psychology to the determination of the conditions of human action and the systematic training of men for specific efficiency. Scientific management has the advantage of connecting scientific investigation with a business purpose and the determination to put it to use. It promises far too much and there will be disappointment all along the way, yet it stands for a true

and timely principle from which untold advances of human society will come.

C. E. S.

We desire to call the attention of our readers to the communication of Mr. Courtis (p. 272) regarding "Standard Tests in Arithmetic." These tests have been carefully selected and afford an admirable means of determining the efficiency of schools, classes or individuals in the fundamental arithmetical operations and in simple arithmetical reasoning. The collection of data for the establishment of norms for different grades and ages on the basis of these tests we regard as one of the most important educational investigations now in progress. In view of the expense and labor involved in an undertaking of this character, we bespeak for Mr. Courtis the hearty support and co-operation of school authorities.

The Institute for Applied Psychology, under the management of Professors Stern and Lipmann, proposes, in connection with the Congress of the Society for Experimental Psychology, to be held at Berlin, at Easter, 1912, to arrange an exposition of materials for investigation in psychography (mental tests, questionnaires, forms for psycho-clinical records, etc.), of psychologically important mental products (literary, musical, artistic, etc., including those made by children and adults of both sexes, by abnormals and supernormals, by primitive peoples, etc.), and of various forms of human expression (handwriting, phonographic records, cinematographs, etc.), in so far as these may be employed for mental diagnosis. All persons who would be willing to contribute materials for such an exposition are asked to communicate with its promoters (Institut für angewandte Psychologie und psychologische Sammelforschung. Neubabelsberg bei Berlin, Kaiserstr. 12.)

At the Mobile meeting of the National Society of College Teachers of Education a resolution was adopted accepting the conditions under which the *School Review* is to become the official organ of the Society. An editorial committee of five, elected by the Society, is to have general control of the policies of the *Review*; the managing editor will be chosen from the staff of the School of Education of the University of Chicago; and the journal will still be subsidized by the University of Chicago and published by the press of that

institution. There will be no radical change in the scope of the *Review*. It will continue to make its primary appeal to those interested in secondary education. The following editorial committee has been selected to represent the Society: F. E. Bolton (five-year term), M. V. O'Shea (four-year term), W. C. Bagley (three-year term), P. H. Hanus (two-year term), and E. H. Holland (one-year term.)

The Division of School Administration of the Federal Bureau of Education has rendered a very significant service during the past few months by issuing at frequent intervals mimeographed legislative circulars outlining the educational measures that have been enacted by the various State legislatures during the current sessions.

At the meeting of the Association of German Headmasters, at Magdeburg, Dr. Speck pointed out two somewhat antagonistic demands that are made upon the teacher. On the one hand he is expected to keep abreast of scientific progress in his own and related fields, and on the other he is called upon to develop the scientific spirit in his pupils. A one-sided pursuit of either of these ends is injurious to the welfare of the school. A decade or two ago scientific culture was perhaps too highly appraised in German schools, but at the present time the instruction aspect is becoming altogether too prominent. Not only is it increasingly difficult to keep up with the rapid advances of science, but the tasks of instruction have also greatly increased. In order to restore the balance, there is need for more science courses for teachers, more scholarships for travel, and more leaves of absence for scientific work. The establishment of the Friedrich Paulsen Foundation is an important step in this direction. Paulsen frequently spoke of the cultivation of the scientific attitude as the most important subject for the consideration of German Headmasters. (This indicates how much more deeply the Germans are imbued with the scientific spirit than are we. Who could imagine such an address before an association of American high school principals?—Eds.)

The Germans have been slow about allowing pupils to participate in the government of the schools. It is reported as a novelty that the *Realgymnasium* of Lüdenscheld, on the Rhine, is to introduce

a certain amount of student self-government. A students' council, elected by the students themselves, will have jurisdiction in questions of subordination, school deportment, and conduct outside of school. The plan is avowedly borrowed from America, and the outcome is being watched with great interest by secondary school authorities in all parts of Germany.

We are in receipt of the current number of *The Child: A Monthly Journal Devoted to Child Welfare*, edited by T. N. Kelynaek, M. D., published by John Bale, Sons & Danielsson, 83-91 Great Titchfield street, Oxford street, London. Annual subscription, \$5.25. The number contains almost 100 pages and presents a varied offering of articles and communications dealing with child welfare. The establishment of such a voluminous and imposing periodical is significant of the growing interest throughout English-speaking countries in the child and his development. We judge from the tone of its articles that *The Child* is intended for the intelligent general reader rather than for the educational or scientific specialist. With this reading public in mind it must be admitted that the material presented is of a high order, and the list of contributors includes a large number of the leading authorities on child welfare in England and America. We cordially welcome the new journal, and trust that it may receive the support of all who are interested in improving the condition of children.

We have likewise received a number of copies of the *Bulletin Mensuel* of the Solvay Institute of Sociology, edited by M. Emile Waxweiler, director of the Institute, and published by L'Institut de Sociologie, Instituts Solvay, Parc Léopold, Brussels. Annual subscription, 12 fr. This excellent *Bulletin* contains in each number valuable *résumés* of books and articles on sociological and psychological topics, detailed reports of the meetings of scientific societies, copious notes on current psychological events, and a complete bibliography of publications in its special field. The annual volume contains about 1500 pages. For those who read French there is no publication that can equal the *Bulletin* for sociological and psychological news.

The eighth annual conference of the high schools and academies accredited by the University of Kansas was held March 23-25, 1911.

Among the papers read were "Medical Inspection and Physical Tests of School Children," by Dr. James Naismith; "Mental Tests of School Children," by Professor Raymond A. Schwegler; "Systems of Grading Students in High School and College," Principal H. L. Miller; "Standards for Measuring the Efficiency of Teachers," by Professor R. R. Price, and "Simple Experiments for Teachers of Educational Psychology," by Professor Charles Hughes Johnston.

The Minnesota Psychological Conference held its third annual meeting at the University of Minnesota, March 31. Noteworthy papers were "A Study in Method of Correcting Stammering in the Public Schools," Miss Florence M. Briggs, and "How Far Does a Child's Grade in the Public School and the Teacher's Label of Excellent, Good, Medium or Poor Represent His Actual Intellectuality?" Professor Isabelle Lawrence. The conference elected the following Executive Committee: Professor David F. Swenson, University of Minnesota; Professor Luther A. Weigle, Carleton College; Professor J. L. Stockton, Winona Normal School; Superintendent A. C. Tibbetts, Blue Earth, and Principal J. C. Bryant, Madison School, St. Paul.

The report of the joint committee on retardation, appointed by the Minnesota Psychological Conference and the Department of Superintendence of the Minnesota Education Association, is worthy of special mention in these columns. The committee recommended that the superintendents make a uniform report at the end of this school year, giving the age-grade distribution of pupils in their schools. This report is to be made on blanks prepared by the committee in consultation with the State Superintendent, and, through the co-operation of the State department of public instruction, sent to all the city school systems in the State. The reports will be filed in the State Superintendent's office. The committee advised this report in order to determine how far the schools of the State are out of harmony with the theory that children enter at six years and progress one grade each year. It is suggested that this technical or theoretical retardation be called "administrative retardation," since it primarily states an administrative problem, *i. e.*, to adapt the course of study to the conditions found to exist. The committee was continued for another year. After formulating recommendations as



to this administrative problem, it expects to take up the question of retardation from the point of view of the child—studying the child's retardation in school attainment as compared with the usual child of its age in the same system of schools—and ultimately the question of retardation in mental development. We consider this one of the most important attempts thus far made to bring the methods and results of educational psychology into vital connection with the work of the schools. The members of the joint committee are Superintendent S. L. Hetter, St. Paul; Superintendent F. E. Lurton, Anoka; Dr. Herbert Woodrow, University of Minnesota, and Principal Albert Gullette, Franklin Graded School, Minneapolis.

The eighteenth convention of the American Physical Education Association was held in Boston, April 11-14. The program presented a varied array of papers dealing with the physiology and hygiene of education.

The Johns Hopkins University has issued the announcement of its first summer session, July 5 to August 16, 1911. There is an attractive list of courses given by members of the regular faculty and visiting professors. In education Professor Burris of the University of Cincinnati offers courses in the history of modern education and in secondary education; Professor Manny of the Western State Normal School, Kalamazoo, Mich., gives a course in school organization and administration and a course on the elementary school, and Professor Edward F. Buchner, director of the Summer Session, has charge of the work in educational psychology. The courses in biology and nature study are in the hands of Professor Clifton F. Hodge of Clark University, well known as one of the leading authorities on nature study.

The University of Vermont announces its third summer session, July 3 to August 11, under the directorship of Professor J. F. Messenger, Dean of the Department of Education. The courses offered place especial emphasis upon work for teachers. Among the visiting instructors are Professor Frank E. Woodruff, Bowdoin College; Professor Robert T. Kerlin, Virginia Military Institute, and Supervisor Mary D. Pierce, Virginia State Normal School.

Dr. Henry P. Bowditch, one of America's best-known physiologists, died on March 13, in his seventy-first year. Dr. Bowditch held three degrees from Harvard and was the recipient of honorary degrees from Harvard, Edinburgh, Toronto, Pennsylvania and Cambridge. He served Harvard as assistant professor of physiology, 1871-1876; as professor of physiology, 1876 to 1906, when he retired as emeritus professor. From 1883 to 1893 he was dean of the Harvard Medical School. He was a member of several learned societies, and was twice a vice-president of the American Association for the Advancement of Science. Dr. Bowditch is especially known for his work on the physiology of the heart, the knee-jerk, the physiology of vision and the growth of children. His contributions to the last-mentioned topic in the annual reports of the State Board of Health of Massachusetts, 1879 and 1891, are among the most frequently quoted references in the literature of anthropometry.

Professor G. M. Whipple of Cornell University has been elected a member of the board of editors of the *Journal of Criminal Law and Criminology*.

Mr. J. P. Gilbert, instructor in zoology in the academy of the University of Illinois, has been elected head of the department of biology and agriculture in the Southern Illinois Normal School.

At Teachers College, Columbia University, Dr. Willystine Goodsell and Dr. William H. Kilpatrick have been appointed assistant professors of the history of education, and Dr. Milo B. Hillegas, assistant professor of elementary education.

Dr. Peter Sandiford, formerly instructor in elementary education at Teachers College, Columbia University, has become lecturer in education at the University of Manchester, England.

## CURRENT PERIODICALS.

(In this section only such articles will be noticed as bear directly or indirectly upon the interests of this Journal.)

INTERNATIONALES ARCHIV FUR SCHULHYGIENE. Vol. VII. January, 1911. *In memoriam Angelo Mosso.* 1-3. The celebrated Italian physiologist, Professor at the University of Turin, inventor of the ergograph, author of important treatises on circulation, respiration and fatigue, and an ardent supporter of hygienic education of the young, died November 24, 1910. MACLEOD YEARSLEY. *The Classification of the Deaf Child.* 4-13. Recommends specific measures for education of the deaf on the basis of the classification: slightly deaf, semi-deaf, deaf-mute and defective deaf-mute. FRANZ HEILBORN. *The Struggle Against School Myopia.* 14-21. We must differentiate myopia developing before, during or after attending school. The first may be ascribed to heredity, faulty kindergarten work or poor illumination at home; the second mainly to faulty light and posture; the third to some unhygienic industrial occupation. Pupils with pernicious myopia should be treated in special classes throughout their school career. DR. HERMANN. *On Feeble-mindedness and Mental Defect and Their Significance for School and Education.* 22-51. A discussion of the definition, the nature and the treatment of feeble-mindedness, with special reference to the problem of the moral imbecile. DR. BAUR. *The Hygiene of Mental Work in Pupils and Teachers.* 52-92. Reviewed elsewhere in this JOURNAL. MAX OKER-BLOM. *Comparative Measurements of Light and Shadow with Various Kinds of Artificial Illumination in the Public Schools of Helsingfors.* 93-120. Measurements were made in five classrooms with Wingen's photometer to compare the distribution of light from artificial illumination, with special reference to the relative merits of direct and indirect illumination and of different heights of the lamps. Illustrations and numerous tables accompany the text. DANIEL KONRADI. *Observations of a School Physician.* 121-128. Tables of body weight and chest measurement of pupils at Kolozsvár, Hungary, show averages above the usual European norms. Urges systematic medical examination of school children, the early recognition of tuberculosis, and the recording of school data on zymotic diseases. *Annual Review for 1909 of the Literature of the Netherlands on School Hygiene.* 160-164.

## PUBLICATIONS RECEIVED TO APRIL 1, 1911.

(Notice in this section does not preclude a more extended review.)

NARZISS ACH. *Ueber den Willensakt und das Temperament*. Leipzig: Quelle und Meyer, 1910. Pp. xi, 324. M.6.50.

This important experimental study of volition forms a continuation of the investigations reported in the author's "Ueber die Willenstätigkeit und das Denken," 1905. Chapter 1 outlines the history and present status of the problem, chapter 2 gives a detailed account of the experiments and a discussion of the results, chapter 3 is devoted to a theoretical consideration of volitional activity in the light of the experiments, and chapter 4 examines the rôle of feeling and temperament in volition. The book is a valuable contribution to the technical psychology of volition.

HENRI BERGSON. *Creative Evolution*. Translated by Arthur Mitchell. New York: Henry Holt & Co., 1910. \$2.50.

To be reviewed later.

SARA A. BURSTALL AND M. A. DOUGLAS (Editors): *Public Schools for Girls: A Series of Papers on Their History, Aims and Schemes of Study*. By members of the Association of Head Mistresses. London: Longmans, Green & Co., 1911. Pp. 302.

This volume opens with an interesting account of the rise and development of English secondary schools for girls. Following this are chapters upon the various phases of school work, each written by a specialist in a girl's school. The concluding chapters of the book are more general in their nature, treating of hygiene, medical inspection, resident schools and boarding-houses, the use and abuse of examinations, and two papers on the aims and ideals of education. The book lacks an index.

*The Carnegie Foundation for the Advancement of Teaching*. Fifth Annual Report of the President and of the Treasurer. New York: 1910. Pp. 113.

The second part of this report contains a valuable discussion of the relations of colleges and secondary schools, in which the complaints of both parties are reviewed, the status of the high school is considered, and a practical basis for articulation is indicated.

GEORGE BARTON CUTTEN, PH. D. *Three Thousand Years of Mental Healing*. New York: Charles Scribner's Sons, 1911. Pp. viii, 318.

A very readable book, giving an account of mental healing from the dawn of civilization to the present. Furnishes an admirable perspective for the proper appreciation of current movements in mental healing.

H. DE VRIES. *The Mutation Theory*. Vol. II, *The Origin of Species by Mutation*. Translated by J. B. Farmer and A. D. Darbishire. Chicago: The Open Court Publishing Co., 1910. Pp. 683. \$4.00 net.

Volume II of De Vries' epoch-making treatise comprises three parts: (1) The origin of horticultural varieties; (2) the origin of ever-sporting varieties, and (3) the relations of the mutation theory to other branches of inquiry. The last part, which is naturally of greatest interest to the general student of evolutionary theory, includes sections on the conception of species according to the theory of mutation, the range of validity of the doctrine of mutation, the material vehicles of the hereditary characters, and the geological periods of mutation. The publishers have furnished in letter-press, illustrations and binding a material setting for this presentation of the mutation theory, which is in every way worthy of its significance.

GIULIO FERRERI. *Questioni Varie intorno all' istruzione dei sordomuti*. Milano: Ditta G. B. Paravia e Comp., 1910. Pp. vii, 261. Lire 2.

The author, who has devoted his life to the education of deaf-mutes, has here collected in book form some of the more important of the many articles he has written on the subject in the last two decades.

W. H. HECK. *Mental Discipline and Educational Values*. (Second edition). New York: John Lane Co., 1911. Pp. 208.

Professor Heck has revised the earlier edition of this useful little book chiefly by adding a summary of the numerous investigations and discussions published during the last year and by modifying and abbreviating his treatment of the bearing of brain physiology upon the problem of transfer. The keen interest that the investigation of educational values has aroused is evidenced by the fact that the first edition of this book was exhausted in a little over a year.

T. N. KELYNACK, M. D., Editor. *Medical Examination of Schools and Scholars*. London: King & Son, 1910. Pp. xvi, 434. 10s.6d.

A valuable compendium of the latest information on school medical inspection. Each of the thirty-two sections is written by a spe-

cialist in the particular topic considered. There are nine sections on general medical examination, sections on eyes, ears, teeth, mental defectives, school clinics, school nurses, etc., and fourteen sections on medical examination in the leading countries of the world. It is a reference book that should be found in every library.

SIR OLIVER LODGE. *Parent and Child: A Treatise on the Moral and Religious Education of Children*. New York and London: Funk & Wagnalls Co., 1910. Pp. 73. 50c. net.

In these little sermons one finds here and there, amid much that is trite and commonplace, interesting reflections on the development of the child mind.

F. E. LURTON. *The Teaching of Hygiene in the Grades*. Reprinted from the Journal of the Minnesota State Medical Association, October 15, 1910. Pp. 11.

A strong plea for the recognition of hygiene as a subject of instruction in the elementary schools.

HEINRICH MAIER. *Psychologie des emotionalen Denkens*. Tübingen: J. C. B. Mohr, 1908. Pp. xxv, 826. M. 18.

An elaborate analysis of thought processes from the point of view of modern studies in logic. The titles of the sections are: (1) Aim and method; (2) emotional ideation; (3) judgment and emotional thinking; (4) affective thinking, and (5) volitional thinking. The psychology is purely theoretical, and the term "emotional" is used in such a broad sense as to be synonymous with "practical."

A. RENDA. *L'Oblio. Saggio sull' attivita selettiva della coscienza*. Torino: Fratelli Bocca, 1910. Pp. viii, 229. Lire 3.

An interesting survey of recent experimental studies in memory from the point of view of forgetting. Forgetting is one of the fundamental facts of consciousness, but one that has been largely overlooked. The author briefly presents the experimental data in regard to forgetting, deduces certain laws of forgetting, rejects associationism as an inadequate explanation, and explains forgetting by the selective activity of consciousness.

*Proceedings of the Nineteenth Annual Meeting of the American Psychological Association, Minneapolis, December 28, 29 and 30, 1910. Report of the Secretary*. Reprinted from the Psychological Bulletin, Vol. 8: February, 1911. 33-62.

*The Relation of Strength of Stimulus to Rate of Learning in the Chick*. L. W. COLE. For easy brightness discrimination an increase

in intensity of punishment for wrong choices increases the rate of learning. *Individual Differences in the Correlation of Physical Growth of Elementary and High School Pupils.* BIRD T. BALDWIN. (See this JOURNAL for March, p. 150). *Experiments on the Perception of Number in Children and Adults.* FRANK N. FREEMAN. "Children first attain proficiency in recognizing horizontal group forms." *Periods of Work in Learning.* D. STARCH. Ten minutes' practice twice a day for six days produced a greater improvement than twenty minutes once a day, and far greater than forty minutes every other day. *Transference of Practice.* D. STARCH. (See this JOURNAL for June). *The Consulting Psychologist.* C. E. SEASHORE. (See this JOURNAL for February, p. 105.)

*Proceedings of the Sixth Annual Meeting of the Southern Society for Philosophy and Psychology, Chattanooga, Tenn., December 27 and 28, 1910.* Report of the Secretary. Reprinted from the Psychological Bulletin, Vol. 8: February, 1911. 63-76.

*Knowing and Expressing.* R. M. OGDEN. "Thought and expression are distinct processes. Adequate expression does not follow as a necessary consequence of clear thought, and, therefore, more stress should be laid on the expressive side of education in an endeavor to cultivate the expressive art individually." *Class and Practice Experiments Upon the Learning Process.* DAVID SPENCE HILL. A discussion of the mirror-drawing test used as a class experiment. *A Comparative Study of Children's Ideals.* DAVID SPENCE HILL. (To be published in the *Pedagogical Seminary*). *Learning and Forgetting.* President's Address. EDWARD FRANKLIN BUCHNER.

*Report of the Board of Education.* Decatur, Illinois, 1910.

The reports of Superintendent H. B. Wilson of Decatur, Illinois, are always both readable and valuable, and might well form a model of what may be done to make a school report something more than a mere record of statistics. Especially important in the present pamphlet is the discussion of what the teachers' meetings have been doing in the past year in the study and improvement of school methods. The meetings were given over very largely to a discussion of two topics, (1) the problem of teaching pupils to study, and (2) the possibility of motivating school tasks. The report summarizes the results of the teachers' efforts in working out these problems in their classes. The superintendent's "cabinet" is composed of the principals and supervisors. During the year this cabinet studied especially the possibilities of formal discipline, and an interesting resume of the discussions occupies four pages of the report.

*Report of the Committee of the American Psychological Association on the Standardizing of Procedure in Experimental Tests.* Psychological Monographs, Vol. 13, No. 1: December, 1910. Whole No. 53. Pp. 108.

*Methods for the Determination of the Intensity of Sound.* W. B. PILLSBURY. Recommends a pure tone rather than a noise. *The Measurement of Pitch Discrimination.* C. E. SEASHORE. (See the present issue of this JOURNAL, p. 278). *Methods for the Determination of Mental Imagery.* JAMES R. ANGELL. Tests are recommended for imagination, memory, reasoning and voluntary control.

M. E. SADLER AND W. T. GOODE. *The Department of Education in the University of Manchester, 1890-1911.* Manchester: At the University Press, 1911. Pp. 146.

Professor Sadler contributes a valuable account of the development of university training colleges in England; Professor Goode sketches the history and outlines the present organization of the Department of Education in the University of Manchester. Bibliographical and statistical appendices complete the volume.

J. T. SEARCY. *The Physiology and Pathology of Psychic Philosophy.* Reprinted from the Diatetic and Hygienic Gazette, May-September, 1910. Pp. 31.

It would be an interesting psychological problem to determine what the author had in mind when he chose this title. One might think it was intended as a joke. The article deals with normal and abnormal mental development from the standpoint of eugenics.

ALBION W. SMALL. *The Meaning of Social Science.* The University of Chicago Press, 1910. Pp. 299. \$1.62.

A very wholesome book, designed to impress the fact of the interrelationship of the sciences. The title is very well justified.

MAX VERWORN. *Die Mechanik des Geisteslebens.* Zweite Auflage. Leipzig: B. G. Teubner, 1910. Pp. 114. M. 1.25.

The author of this little book is one of the greatest of living physiologists. He denies the duality of mind and body, and claims that all reality is of one sort, that thoughts are conditioned by present or past environment, just as any other form of existence. The important conditioning factor of thought is the nervous system, and the book outlines the functioning of the nervous system in normal waking consciousness, in sleep and in hypnosis.



Peter Sandiford

## MEASUREMENTS AS APPLIED TO SCHOOL HYGIENE.\*

LUTHER H. GULICK, M.D.,

*Russell Sage Foundation.*

In calling to order this Fifth Annual Congress of the American School Hygiene Association I wish to express to the New York Academy of Medicine our appreciation of their courtesy in inviting us to meet, without expense, in this building, with its splendid record of service to the cause of medicine and to humankind, and its long list of physicians who have been and are making common cause with all those who aim not merely at the cure and prevention of disease, but even more at the upbuilding of human vitality. We are proud that one of our officers is also one of theirs—Dr. Abraham Jacobi.

I cannot let this occasion pass without drawing attention to what I believe to be a fundamental need, not only in school hygiene, but in all that proudly marches under the name of science. I refer to *the need for definite measurements of results already obtained*—measurements without which neither medicine nor education can ever become scientific. I do not need to remind you that it was through the use of measurements that alchemy became chemistry, astrology became astronomy, physics grew out of mystery. The great need of the school hygiene course today, as well as the greatest need of education itself, is not authority nor philosophy; it is a need for definite methods of measuring the effects of present systems and practices.

I am sure that the occasion has now so far gone by that I may speak, without venturing beyond the limits of personal courtesy, of a conversation which took place between Dr. Wm.

\*Opening address as President of the American School Hygiene Association, Fifth Annual Congress, New York, February 2-4, 1911.

H. Maxwell and myself at the time I became director of physical training in the New York Public Schools—a conversation which he may have forgotten. I said:

“Dr. Maxwell, let us take all of the schools in several sections of the city—enough different sections so that the test will be a fair one—and do away with physical training in half of these schools, leaving it in operation in the other half, all other conditions to be the same in both schools. Then we shall see what physical training really accomplishes; we shall know whether the boys and girls in the schools having physical training become taller and stronger than the boys and girls in the schools not having physical training.” Dr. Maxwell answered:

“The plan is impossible. People would protest that their children were being experimented upon. The public demands absolute knowledge on the part of the instructors; experimentation would not be tolerated. You are employed to take charge of the physical training because it is believed that you know your business—that you have accurate information as to the effect of the things you are undertaking to do.”

“But,” I said, “I do not know the actual results of such work as this; nobody knows. I believe my methods are right, but I want to find out definitely by making comparative measurements.”

“No, it would never do,” was Dr. Maxwell’s reply. “Any school administrator that worked on the basis you propose would not only be attacked by public opinion, but he would be put out of any position of responsibility.”

Dr. Maxwell was right. This is in general the attitude of the public today; yet progress is not possible in school hygiene or in any other educational work if it is demanded that schoolmen have the accurate knowledge which they have had no opportunity to secure.

In order to make satisfactory progress along the line of school hygiene there are many questions that need to be definitely settled. Most of these questions are fundamental, not only with reference to school hygiene and education, but with reference to human progress and intellectual activity.

For example, what is the best age for a child to enter school? This is a question that could be definitely answered if we could secure adequate data on the subject. Galton and Karl Pearson have given us the tools, life itself gives us the material, for obtaining such data. We need only the opportunity. I venture the assertion that almost every person in this room has convictions upon the subject, and yet that these convictions are based upon a few personal experiences in each case. Physicians tend to put the best age for entering school rather high; schoolmen tend to put it low. In my own case, as a father, I was influenced by my study of medicine to believe that one of the perils of the age was forcing children to go to school too early; that school routine at six years of age was dangerous to a highly organized girl, and that it was a biological crime to force such a child to sit still when all her instincts commanded her to wriggle. Therefore, my child was in school very little until she was eight years old. Even at that age she had already passed the best years for acquiring languages, either by speaking or writing. She has been "over age" all during her school life. I may have done her a great wrong.

My point is this: that neither schoolmen nor physicians nor parents are competent to judge such questions as this *ex cathedra*. Theories and convictions can never solve such problems; their only solution lies in a searching analysis of existing conditions, in measuring results in a sufficient number of cases to arrive at definite conclusions. Such investigations should be conducted in accordance with modern scientific methods.

It is concerning the most fundamental questions, moreover, that we are still at sea. We do not know the number of hours a child should study each day in order to make the most progress at each age. There is no one trying to find out, so far as I know. We do not know how many subjects a child can study to advantage at each age. We do not even know the most effective and economic size for a class at various ages. It might be, for example, that in a class of 70 children each child would get so little instruction that a number of them would be held back, and this would cost the school system more than if there had been only 50 in the class. We do not know the number of months in the year

that children should attend school, yet we compel all children to go to school upon the assumption that we do know.

We do not know the proper length for each period of attention in different subjects. That is, in arithmetic a child of ten years might be able to give only ten minutes' consecutive attention without fatigue, whereas in history the same child might spend an hour to advantage. We do not know how much moisture there should be in the air of the schoolroom, nor the relation of the temperature and humidity of the atmosphere to mental fatigue and intellectual effort. We do not know fully the degree to which it is worth while to study when we are fatigued. I do not mean that we cannot push ourselves beyond the point of fatigue; but that, considering children and adults merely as machines, there is a point beyond which it does not pay to push, since we get only a diminishing return.

I might easily spend all the time available for these introductory remarks in enumerating the underlying problems connected with the education and the health of children which are as yet matters of theory. We have thus far no units of measurement by which we can tell whether or not we are making progress in educational methods, yet the education of our children is the largest and in many respects the most important occupation in which the civilized world is engaged. There is no more fertile field in the whole world of scientific activity than the work of bringing the young human being into satisfactory adjustment with the life he is to lead.

In the United States alone we are spending about five hundred million dollars a year on public education. This does not include the vast sums spent by the great endowments, by privately established institutions for higher learning, or by private schools. Of nearly thirty-five millions of dollars spent for education in New York City last year, hardly a dollar was expended for the purpose of measuring the results we are getting. This was not because our Superintendent of Schools did not see the need for such measurements; he has seen the need and has appealed without success to the Board of Estimate and Apportionment for funds which would enable him to provide the necessary equipment for securing these data. We see the significance of examining our coal to be sure that

we are getting the best and the cheapest; we do not see the significance of examining the output of our school system to be sure that we are getting the best results from our expenditure.

Can one of you here today name an educational endowment, a school of pedagogy, or any other agency that is collecting and making available the evidence on any one of these great questions? There are several great funds of ten, twenty-five, fifty millions of dollars available for research, for giving salaries to retiring professors, for supporting education in the South—admirable purposes, all of them—but does there exist a single endowment of any amount whatever for the purpose of ascertaining what has been accomplished with the hundreds of millions already spent in education? An endowment similar to that of the General Educational Board, which should devote its income, not to the support of education, but to establishing modes of measuring progress, and to the application of these measurements in such a way as to render effective the great mass of educational experience already in existence, would, it is safe to say, revolutionize the status of education in a single generation and establish it upon a scientific basis.

Am I overstepping the facts when I say that there is scarcely a city in America that is satisfied with its public schools? Here in New York City an investigation has been proposed; and those who follow educational matters know that in city after city severe criticisms of the school systems are constantly coming up. Even schoolmen themselves disagree when they come together to discuss these questions. You cannot get a group of educational people together without having a controversy upon some one of these problems. As individuals, in fact, we cannot settle these matters to our own satisfaction. They can only be settled by ascertaining results—by measurements of what we are doing.

## TRANSFER OF TRAINING IN ARITHMETICAL OPERATIONS.

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### SUMMARY.

Eight observers practiced for fourteen days on mental multiplication. Before and after the practice they were given six tests in arithmetical operations, and two in auditory memory span. For comparison, seven other observers were given the preliminary and final tests without the practice series. The practiced observers showed from twenty to forty per cent. more improvement in the arithmetical tests than the unpracticed observers. There was little change in memory span for either group.

The purpose of this experiment was to obtain data on the transfer of training in a new field of mental activities, similar to certain school exercises. For this purpose several types of mental calculation were chosen.

The training series consisted of mental multiplication continued for fourteen days. The problems were composed of three digits in the multiplicand and one in the multiplier. The numbers were so selected that they would be fairly uniform in difficulty. Only those digits were used in combination which would always leave one to be carried when multiplied. The digits from four to nine were the only ones used as multipliers, and those from two to nine the only ones used in the multiplicand. Fifty problems were put on one sheet of paper. Altogether fourteen sheets were prepared. No problem occurred oftener than once. The subjects did one sheet a day and recorded the time.

The end tests made before and repeated after the training series consisted of six sets of different arithmetical problems

and of two tests of the immediate auditory memory span. The nature and order of the end tests were as follows:

1. Eight problems in adding fractions.
2. Eight problems in adding two three-place numbers.
3. The memory span for numbers.
4. Eight problems of subtracting three-place numbers.
5. Eight problems of multiplying a four-place number by one digit.
6. The memory span for words, using monosyllabic nouns of objects.
7. Eight problems of multiplying a two-place number by one digit.
8. Eight problems of dividing a three-place number by one digit.

Each set of end tests was made in the double fatigue order. A different set of problems was, of course, used in the end tests made after the training series. All calculation was done mentally; that is, the subject looked at the problem long enough to get it in mind, then closed his eyes, or looked away and worked the problem. Then he wrote down the answer and proceeded to the next one. The subjects were instructed to work as rapidly as possible without making mistakes. If they discovered that they had made an error, they were not to correct it, but to continue.

The memory span tests were made by reading to the subjects groups of words or numbers at the rate of one word or number per second. The sizes of the groups ranged from four to ten. They were presented in regular order, beginning with the smallest. After each group had been read the subjects wrote down all they remembered.

Fifteen persons took part in the experiment. Eight went through the entire experiment and seven went through the end tests only. The purpose of the latter was to determine the amount of improvement in the performance of the end tests themselves, which must be deducted from the improvements made by those who took the training series. The remainder would be the improvement due to the training series.

The results are set forth in the following tables:

TABLE I. *Percentages of improvement in the end tests of the eight persons who took the training series.*

	1	2	3	4	5	6	7	8	Aver- ages.
Adding fractions.....	17	54	38	28	35	50	68	28	40
Adding three-place numbers...	55	86	76	41	40	39	48	11	49
Memory span for numbers.....	13	-13	0	-7	0	-6	-10	0	-3
Subtracting numbers.....	52	68	72	50	44	40	80	59	58
Multiplying four-place numbers	61	78	45	38	44	34	61	66	53
Memory span for words.....	8	10	36	-8	0	-8	0	-17	3
Multiplying two-place numbers.	52	74	19	25	57	46	65	41	47
Dividing three-place numbers..	50	47	62	27	36	29	70	41	45
Per cent. gain in training series, comparing first and last day.	53	60	48	42	49	16	64	63	50

TABLE II. *Percentages of improvement in the end tests of the seven persons who did not take the training series.*

	1	2	3	4	5	6	7	Aver- ages.
Adding fractions.....	14	16	-36	11	25	15	39	12
Adding three-place numbers....	59	20	4	-10	18	19	-43	10
Memory span for numbers.....	0	0	-12	0	0	6	-6	-2
Subtracting numbers.....	70		32	29	39	5	33	35
Multiplying four-place numbers..	54	38	40	16	42	17	-4	29
Memory span for words.....	-8	0	8	-17	-7	0	-8	-5
Multiplying two-place numbers..	0	28	31	0	14	14	-20	10
Dividing three-place numbers....	11	10	40	37	42	29	8	25

TABLE III. *Differences between the averages of Table I and of Table II, showing the amount of improvement due to the training.*

	Trained persons.	Untrained persons.	Difference.
Adding fractions.....	40	12	28
Adding three-place numbers.....	49	10	39
Memory span for numbers.....	-3	-2	-1
Subtracting numbers.....	58	35	23
Multiplying four-place numbers.....	53	29	24
Memory span for words.....	3	-5	8
Multiplying two-place numbers.....	47	10	37
Dividing three-place numbers.....	45	25	20
Averages, exclusive of memory span.....	49	20	29

The above tables show that training in one type of arithmetical operations improves very considerably the ability to do other fundamental arithmetical operations. The average improvement in the training series was 50 per cent. comparing the last day with the first. The average improvement in the end tests, not including the memory span tests, was 29 per cent. (third column in Table III). Consequently the improvement in the end tests was 58 per cent. as large as in the training



series itself. This is a rather large amount of improvement. Woodworth and Thorndike, for example, found that individuals who had improved in recognizing words containing e and s showed only 39 per cent. as much improvement in noticing words containing i and t, s and p, etc.

In what way did the training in mental multiplication help in the other calculations? According to the introspective accounts, the largest factor was the ability acquired, in the training series, of keeping the numbers better in mind. This will become clear by quoting from the introspective records. One person wrote after the first end tests: "I had much difficulty in holding the image of numbers in mind. I had to repeat the numbers to myself after I added each two digits (referring to the addition test)." After the completion of the experiment the same individual wrote: "I took my image of the numbers and went at once to the calculation without repeating the figures to hold them. I also noticed that at first I repeated to myself each figure of the answer as I gained it. I did not have to do that at the end."

Several individuals mentioned the acquisition of the method of calculating by simply visualizing the arithmetical operations. For example, one says: "Toward the end of the training series I had no trouble whatever in keeping the numbers of a problem in mind while doing the calculating. I also fell into the habit of simply speaking by 'inner speech' the digits of the answer in the order in which they were obtained, and merely visualizing without 'inner speech' the operations of multiplying and adding the figure carried from the last multiplication. This kept me from becoming confused. These are the two acquisitions that I carried over from the training series to the end tests: (a) It seemed easier to keep the numbers in mind. I did not have to spend any time trying to impress them before beginning to figure, except in subtracting and adding three-place numbers, and then not nearly as much as in the first end tests. (b) I spoke to myself the digits of the answer only, and visualized the other operations." It is also interesting to note that this individual adds: "I did not purposely try to apply these methods in the end tests."

At the beginning it was so difficult to bear the numbers of a

problem in mind while calculating, and the problem often became so confused that the calculating had to be started all over again.

The improvement in the end tests was due, therefore, to the identical elements acquired in the training series and directly utilized in the other arithmetical operations. The two main factors were (a) the increased ability to apprehend and hold the numbers in mind, and (b) the acquisition of the ability to visualize arithmetical operations.

The memory span showed practically no change, partly because it is too dissimilar to the functions involved in the training series and partly because it does not seem to be subject to much enlargement through training.

The outcome of the experiment also emphasizes the necessity, in investigations on transference, of performing the end tests only upon a group of individuals and deducting their gain from the gain made by the trained individuals. If this had not been done in the present experiment, the average improvement in the end tests would be almost exactly as large as in the training series, namely, 49 per cent. and 50 per cent., respectively. The average gain in the end tests, excluding the memory span, shown by the individuals who did not take the training series was 20 per cent. The large amount of transference shown, for instance, by the experiments of Ebert and Meumann<sup>1</sup> is due to the failure to make this deduction.

<sup>1</sup>"Ueber einige Grundfragen der Psychologie der Uebungsphaenomene im Bereiche des Gedächtnisses," *Arch. f. d. ges. Psych.*, 4, 1905, 1-232.

## RETENTION AS RELATED TO REPETITION.

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### SUMMARY.

Twelve subjects were tested for their rate of learning a passage of easy prose, and for their retention of the passage after a lapse of twenty-four hours. The most rapid learners showed the highest percentage of retention.

In the experiments here reported we have been concerned chiefly in determining the relation of retention to number of repetitions—the relation of memory to quickness of learning. Our results, however, throw light on other problems of memory, and, we hope, have some significance for education.

Much of the experimental work that has been done in memory contributes to the solution of our problem, and, on the whole, points to a positive correlation between learning and remembering (9). Müller and Schumann (4) found that in the learning of nonsense syllables the person that learned a series in the shortest time also relearned the same series after twenty-four hours in the shortest time. The slow learner, however, saved more both absolutely and relatively than the fast learner. But, although the fast learner had forgotten more, he relearned what he had forgotten in less time than was required for the slow learner to relearn what he had forgotten. The fast learner, then, has the advantage; learning, in the first place, in the shortest time, and relearning what is forgotten in the shortest time. Ogden (7) got much the same result. In his experiment rarely does the fast learner require more time for relearning than does the slow learner, and usually requires less. Ogden's experiments include tests with meaningful, as well as nonsense, material, with practically the same results for both. The curve of relearning is, in general, parallel to the

learning curve, although it shows some flattening. The individual differences in relearning are not so great as the original differences in learning. That is to say, the differences in retention of a number of individuals are not so great as their differences in time for complete learning.

Whitehead (11) thinks slow learning means a quicker relearning or better retention, but an examination of his tables (pp. 267 and 268) does not support his contention. If we eliminate the results from one of his subjects (the eleventh in first table, p. 267) as being an error, for it shows a relearning time longer than the time for original learning, and add the relearning times for the fast six and slow six, respectively, we find without exception that the six who had learned in the shortest time also relearned in the shortest time. In fact, if we rank the two series for learning and relearning, for the various tables, from best to poorest, we find a fairly high degree of correlation between quick learning and good retention.

Henderson (2) found that the best learners retained the largest percentage of what they had learned. His experiments did not consist in complete learning. The matter for memorizing was presented to the learners only once, and it was found that those who got the most from this one reading retained the largest proportional amount. This, of course, is not the same as complete learning, for it is conceivable that the slow learner, if he should keep at work till he had learned as much as the fast learner, might retain it better. Henderson's material was much the same as ours, *i. e.*, connected thought. Norsworthy (5) got the same results by using a different material and a somewhat different method. She found that the students who learned the greatest number of words in a German-English vocabulary, in a given time, retained the largest percentage of what had been learned. But here, again, we are not sure of what the results would have been if the slow learners had been allowed to repeat their words till they had learned the same number as had the fast learners. Our experiments give ground to doubt that this would have been the case.

The work of Ogden and others (3) to determine the effects of different rates of presenting material to be learned is not

exactly on the problem which we have before us. Although they found that the fastest rates used in committing nonsense syllables to memory gave quicker learning, but poorer retention than slower rates, it is nevertheless true that of *different* learners using the same rate of saying the syllables over in learning them, the person who memorizes a series in the fewest number of repetitions may retain as well or better than the slower learner.

Our own experiments were begun in February, 1910, and continued for about a year, including the summer session of 1910. Agreeing with Henderson (2) that the kind of memory experiments most needed now is that which deals with thought material, so that the results and conclusions may be applicable to actual school conditions, we selected for use in our work a small book on nature study, entirely unknown to the learners, although its subject-matter made a fairly equal appeal to all of them. The book was divided up into segments, each containing 40 ideas and about 150 words, much after the plan of Shaw (9). Our method was to present the material to the subjects individually in a quiet room under uniform conditions. After each presentation the learner was required to give orally to the experimenter as many of the ideas as could be recalled. The matter would then be presented again, after which the learner would give all the ideas he could recall, and so on till the learner could repeat readily all the 40 ideas. The learning was not required to be verbatim, but in the learner's own words. The learner was also allowed his own time and manner of recall so as to permit each mind to work in its own way. The recall time was fairly constant, however, being five to seven minutes; the quickest learners used the shortest time. Careful records were kept of the condition of the subjects and of all facts that could throw light on the nature of the results. It was found, for example, that poor health, loss of sleep, overwork, etc., always made a longer learning time and poorer retention. In our last experiment the material was always read to the learners by the experimenter. In the first and second experiments the material was presented in three different ways: (1) Reading aloud by the experimenter, (2) reading aloud by the learner, (3) reading

silently by the learner. We finally used only the first method, because it gives a better control of the experiment. If the learner is allowed to read the material himself, one can have no assurance that he does not read portions more than once. Twenty-four hours after each learning the subject was required to write down all the ideas that could be recalled. The subjects were asked not to think of the matter in the interval, and, as a matter of fact, they seldom did.

Our subjects were seniors and graduate students. Four of them were women: B, Ti, J and F. It will be noticed that the women made the best records. Of the twelve subjects, four took part in the experiments shown in Table I, four in those shown in Table II, and the other four in those shown in Table III. In Table I we give not only the average results obtained in the experiments described above, but other data showing the records of the subjects in different kinds of memory tests. Column 1 gives the total number of objects and words retained in a series of immediate memory tests; column 2 the number of repetitions required to commit to memory a series of 25 nonsense syllables; column 3 represents the immediate memory for thought material got at one presentation, while the last two columns show the results for the complete learning of connected thought.

TABLE I.

Subjects.	Words, objects, pictures.	Rep. for nonsense syllables.	Immediate memory.	Av. rep. complete learning.	Retention after 24 hours.
B.....	78	59	22	3 $\frac{2}{3}$	40
M.....	66	134	18	6 $\frac{1}{2}$	37
Th.....	62	121	10	10 $\frac{1}{3}$	34
Wi.....	49	123	15	6 $\frac{1}{2}$	40

It will be seen that B makes the best record in all the tests. While Wi is poor at everything else, he is good at memorizing and retaining the connected thought. Evidently the memorizing of connected thought involves factors not represented in the memorizing of words or nonsense material. In the later experiments we therefore confined the work to the learning of connected thought.

Table II gives the results obtained from another group of learners. The results are averages obtained from four experi-

ments of each type of presentation, and in the last columns are to be found the general averages and the average deviations expressed in per cent.

TABLE II.

Subjects.	Read aloud to subject.		Read silently by subject.		Read aloud by subject.		—General averages.—			
	Reps.	Reten.	Reps.	Reten.	Reps.	Reten.	Reps.	dev.	Reten.	dev.
Tr.....	10.5	35.75	6.5	35.75	5.5	30.25	7.5	28%	33.92	7%
St.....	4.75	35.00	4.0	35.25	4.5	31.25	4.42	16%	33.83	8%
Sc.....	6.75	36.25	6.2	35.75	5.5	36.50	6.17	14%	36.17	4%
Tl.....	3.75	37.50	3.2	39.00	2.5	38.75	3.17	18%	38.42	3%

The very best learner, it is seen, has also the best retention and the most constant and reliable memory, as is shown by her smaller average deviation for retention. The first and second subjects have practically the same retention, although they differ widely in learning, while Sc, with an intermediate learning time, retains better than either Tr or St. This experiment would show that the fast learner at least has no disadvantage in retention. No inference can be made from this table as to the best method of presentation. The experiments were given in the order shown by the table, and the better records noticed in the second and third forms of presentation are doubtless due to improvement through practice, for in our next experiment, in which but one method was used, a constant improvement is shown.

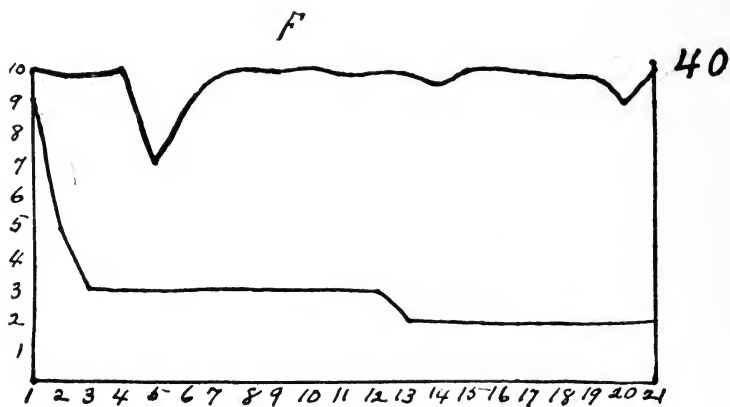
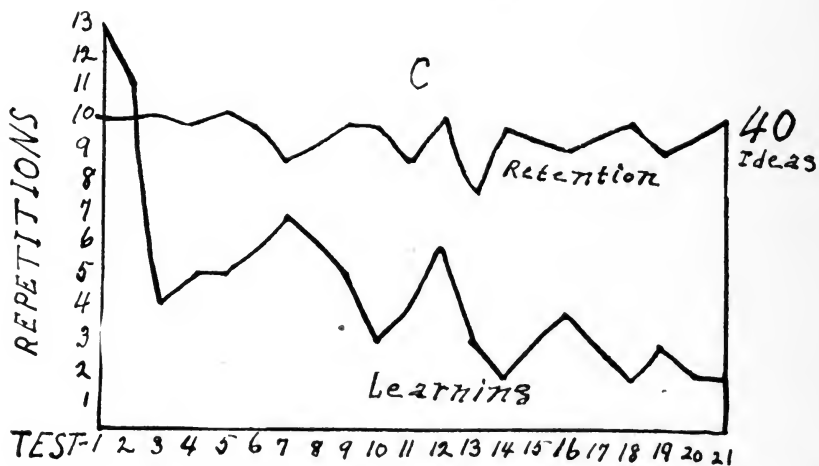
In Table III are shown the results of our most extended experiments. Each subject learned 21 separate segments of material, containing 40 ideas each, and the greatest possible care was taken to keep the conditions constant and uniform for the different subjects. In every case the material was reproduced in writing 24 hours later by the learners.

TABLE III. *Material always read to subjects.*

Subjects.	Repetitions.	Av. dev.	Retention.	Av. dev.
C.....	4.7	2.24	37.5	2.0
F.....	2.9	0.78	38.5	1.7
K.....	5.2	1.40	34.2	4.6
J.....	3.6	1.90	36.7	3.2

The results show that the slow learner certainly has no advantage in retention over the fast learner. The differences

in retention, however, are much less than the differences in learning. Our results, therefore, correspond to those obtained by Ogden. This seems to indicate that if the learning of the same material by different learners is carried to the same point of organization there may be little difference in retention. The curves of learning and retention for this experiment show that the same amount of material was learned in shorter and shorter time as the experiments progressed, although the retention remained practically as good for the faster learning as it had been for the slower learning.







Interesting in this connection, for comparison, are the results of an experiment on six subjects in the learning of a series of 25 nonsense syllables, forward and then backward, as shown in Table IV. The procedure was to learn the series at one sitting, by repeating the syllables to the stroke of a metronome, according to the method of Ebbinghaus, then re-learning them on the second and succeeding days until they could be said daily from memory. When this point of automatization was reached the series was then learned backward. Four of the subjects were those taking part in experiment 1.

TABLE IV. *Nonsense syllables.*

Forward.				Backward.			
Rep. for first		Total.	Ratio.	Subj. First.		Total.	Ratio.
Subj.	learning.						
Wi.....	123	150	1.2	Wi.....	27	38	1.4
Th.....	121	129	1.06	Th.....	79	105	1.3
We.....	118	147	1.2	We.....	72	111	1.5
Sw.....	99	136	1.4	Sw.....	67	89	1.3
Sn.....	72	85	1.2	Sn.....	20	40	2.0
B.....	59	70	1.2	B.....	20	31	1.5
Av.....	96	117	1.2		47.5	69	1.4

Time did not permit the learning of any more syllables in this way, and perhaps no conclusions are warranted on such meager data, but the uniformity of the above ratios is suggestive. The figures in the columns marked "total" were obtained by adding together the number of repetitions for each day's learning until the series could be repeated after 24 hours without looking at the list; that is to say, the learning was carried to the point of fairly permanent automatization.

That the learning backward was relatively harder to carry to the point of automatization was doubtless due to the interference of the habit of saying them forward. It would seem, then, that every person has a definite coefficient of learning capacity, and that the more quickly one can learn, the more quickly one can reduce to automatization, *i. e.*, make the matter permanent. Even if the fast learner had no advantage in retention, he would still, other things equal, have a great advantage over the slow learner, for he can make his acquisition just as fixed and permanent as does the slow learner and have time to spare for learning other things or other aspects of the same thing. It is interesting to compare the average records made by the learners on the first and second readings of each test. In the third experiment the four learners made the following averages on the first reading in the 21 tests: J, 29 points; F, 26 points; C, 17 points; K, 16 points. At the end of the second readings the following averages were made: F, 36 points; J, 35 points; C, 28 points; K, 26 points. Therefore, for these four learners and for the length of test given, two readings give a better index of the complete learning time than does one reading. But a comparison of the detailed records of all our tests with all the observers makes it evident that immediate

reproductions of single readings of subject-matter give a fair idea of a person's complete learning time, provided that the matter be familiar. In our experiments the fast learner was also more accurate; his reproductions would always be nearer to the exact meaning of the original than would the reproductions of the slow learner. Perhaps related to this is the fact that our best learners excelled at committing poetry to memory in a few tests that were given them.

The improvement of memory with practice is very evident from the curves. That the improvement of J is greater than that of the others is perhaps due to the fact that her experiment was spread out over much more time than was that of the other three. J worked three times a week; the others daily except Sunday. Practically all experimenters in this field have found improvement in memory with practice. How general this improvement is is a question on which our experiment throws no light.

The question of the relation of memory to scholarship naturally arises.<sup>1</sup> Some investigators have found a positive correlation; others have not. We have several times tried to find how the matter stood in our own classes, and have found only a slight correlation—something like .30 by the Pearson formula. Yoder (12) thinks geniuses have better than the average memory. If a good memory means good retention, why do we not find a higher correlation between memory and class standing? Doubtless because many factors contribute to good scholarship, memory being only one of these factors. Habits of study, for example, have much to do with class standing. If a slow learner has the habit of going over a lesson or task several times, and a fast learner the habit of giving a lesson but one hasty reading, other things being equal, the slow learner will have the better scholarship. But if the fast learner has good habits of study, goes over a lesson more than once and at different times, so as to get the advantage that comes from initial readings and from repetitions, he will excel in scholarship. As a matter of fact, while we have never found a very high degree of correlation between memory and schol-

<sup>1</sup>See, for a brief discussion and bibliography, Max Offner (6), *Das Gedächtniss*, 1909, p. 219, and Bib.

arship, we have found that the few very best students possess both the best memories and good habits of study. Of course, there are many other factors that make a good student besides the two considered. It is true that our retention tests were given only 24 hours after the learning, and it might be said that in the long run the slow learners would retain the most. We tested the retention of two learners, F and C, in experiment III, one month after the close of the learning, using the even-numbered tests, that is, the second, fourth, and so on, and found that the retention of these two learners was practically the same. We have also tested the retention of the members of large classes a month after matter was given, and found the chances to be at least three out of four that students would maintain the same rank in long retention that they had in immediate reproduction. This fact has an important educational significance. It means that the student who gets the most out of a lecture will have the most on examination day, provided that there is no reviewing or further study. Learning is the important thing. Teachers should try to get the slow learners to put sufficient time on their work to *fix* it. It would seem to be the duty of teachers to determine the kind and strength of memory possessed by their students so that the students could form proper habits of study. It is also important that students know the value of properly learning and organizing subject-matter as they go along, then retention will take care of itself. Other educational implications of this study were published in this JOURNAL for October, 1910 (8).

#### CONCLUSIONS AND INFERENCES.

1. The fast learner is at no disadvantage in retention.
2. Individuals differ less in retention than in learning ability.
3. Women—in our experiments—do better than men.
4. Every individual probably has a definite coefficient of learning capacity, which is an index of the time necessary for habituation.
5. An immediate memory test probably gives a fair index of permanent retention, also of habituation time, a good record meaning short habituation time and good retention.

6. One habit interferes with another using the same elements in new combinations.

7. The fast learner, in our experiments, is more accurate than the slow learner.

8. Memory improves by practice in the field where it is exercised.

9. There is a slight positive correlation between memory and good scholarship, memory being only one of the factors that make good students.

10. Students should be tested to ascertain the quality of their memory so that they can form proper habits of study.

11. Teachers should endeavor to bring the learning of all students to the same point of automatization. This will mean more work for some students than others.

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## PSYCHOLOGY IN THE NORMAL SCHOOL.

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### I.

No one will deny that "Psychology in the Normal School" is a familiar theme; but the editor thinks it is not entirely worn out, and he says it should receive attention in this magazine, which is the writer's excuse for presenting his views upon it at this time. Limitations in respect to space require that the present paper be confined mainly to a discussion of prevailing methods in the teaching of educational psychology, while some detailed constructive suggestions must be reserved for a later occasion.

In considering present practice it seems there are two problems which should be kept wholly separate. The first concerns instruction in psychology so that it may become effective in the work of those who study it in order that they may receive help from it in their teaching, while the second relates to the making of contributions to the theory and practice of education; and both these problems should be of as great interest to departments and schools of education in the university as they are to the normal school. In respect to the first problem, there can be no doubt that a large proportion of educational people, as well as laymen, are not at all pleased with the practical results ordinarily flowing from the study of psychology by candidates for teaching, whether in the normal school or in the university. The present writer, in the pursuit of concrete data for this paper, has interviewed a number of teachers in different parts of the country, asking them what benefit they derived from their courses in psychology, and how they enjoyed the work. While some of these teachers indicated clearly enough that they were interested in the subject, and that it had

helped them to solve the problems of the class-room, still the majority of them said frankly they had no kindly feeling for it, they did not understand a considerable part of it, and they did not think it had contributed a great deal toward clearing up dark places in teaching or in discipline.

It is a fact, and a rather important fact, that many, though happily not all persons who have been through the normal school, and who have, in addition, completed a course in psychology for teachers in the university, seem to have but slight faith in its practical helpfulness. Teachers have frequently said to the writer that they could have devoted their time and energy to studies of a more profitable character. Normal-school graduates who have come to the university for further study often object to spending any more time or effort on psychological studies; but, instead, they generally prefer, until they have had a taste of concrete, vital psychology, to give their attention to the subjects which they intend to teach. They maintain that they have had enough, and too much, of "theory," which seems to them quite remote from the real situations presented in the class-room.

## II.

It is probable that the teaching of psychology, and of subjects that are supposed to be based upon it to a greater or less extent, is no more unsatisfactory from the standpoint of practice than the teaching of other subjects, either in the normal school or outside. It is apparent that a certain formal, abstract, and non-vital method of presenting knowledge has often been adopted in psychology as in other branches, and with similar more or less mechanical and ineffective results. One hears to-day wherever he goes that the teaching of rhetoric, say, as a body of principles supposed to constitute a guide to effective writing, may exert little, if any, influence upon the actual written expression of the pupils who are put through it, either in the high school or in the college. This principle has become generally recognized as it relates to the teaching of grammar. Probably most readers of these lines can remember the time when grammar was taught throughout the elementary school course in the belief, generally entertained, that its

mastery conferred upon a pupil the ability to speak and write accurately, fluently and effectively. But one rarely comes across a person now who will make any such claim for it. On the contrary, it is often said that much study of grammar early in a pupil's career may be a handicap rather than a help to him in developing a fluent and dynamic style, because it may tend to make him unduly heedful of mere technique, which ought not to occupy a conspicuous place in his consciousness when he is under the necessity of expressing himself.

The tendency in the teaching of any new subject, and perhaps of older ones, too, as Latin and geometry, is to organize the phenomena treated in a formal, logical way as may suit the adult mind, and then to present principles that are, to the novice at any rate, far removed from the concrete situations to which they are supposed to apply. The teacher of German, say, may systematize all the rules of grammar and make his pupils learn them, and then seek illustrations of them in formal instances such as he would rarely use if he had need actually to express himself in German, or to gain thought through reading it or listening to it while it is being spoken. And what is, or at least has been, true of the method of the typical instructor in teaching German has been at some time or other, or is now true of the typical instructor in each subject of instruction found in the curricula of either the lower or the higher schools.

### III.

I have mentioned these more or less commonplace instances as familiar illustrations of the formal, non-vital method of teaching which has been so largely followed in presenting subjects to pupils, alike in elementary and in advanced classes. The principle is as true in educational psychology as in other branches. A graduate of a normal school writes me that in his course in the psychology of teaching he was taught that "pupils should not be permitted to learn things by heart," and yet he was required "to memorize verbatim every principle or law mentioned in the textbook used in the course." A college graduate states that in his study of psychology he devoted his energies mainly to memorizing the contents of books. He



says his instructor usually insisted upon a precise reproduction of the text, with very little illustration except that given in the book. The examinations consisted wholly of questions designed to ascertain whether pupils had really fixed the text securely in memory.

According to the observations of the present writer, in the methods of teaching educational psychology in the normal school and college, which are now coming into vogue, less emphasis is being placed on mere mechanical memory than was the fashion in an earlier day; but even yet there is much formalism in this subject, as one may readily note who will test students who have had courses therein. Candidates for positions as teachers can often define perception, sensation, memory, etc., but they cannot, or at least they do not, generally observe the principles defined when they come actually to present subjects to the young. I have tested teachers who had passed examinations in psychology for teachers' certificates, and who had given acceptable formal answers to conventional questions, but most of them could not describe psychologically what processes a child was employing, or ought to employ, in a concrete case of playing marbles or tag, or reading a story, or learning his spelling lesson, or drawing a map, or speaking a piece, or diagramming a sentence, or singing a song, and so on. I have asked normal-school and college students who have had courses in psychology to describe their own methods of studying various subjects, and as a whole they have not shown any more economical or effective habits in this regard than have their classmates who have had no formal psychology whatever. In such cases, which seem to be typical, the principles of perception, memory, reason, etc., which were "learned by heart," appeared to bear no more directly upon the problems of every-day life in learning and teaching than did those of astronomy or geometry or Hebrew.

Psychology, as it has been taught to candidates for teaching, has been treated as a formal science, starting with definitions, then following with the "simplest" psychical elements, as sensations, and then proceeding to ever more complex matters, viewing the subject structurally. The same method has been followed in physiology, in starting with cells or bones, and

taking up the different organs and functions in the order of their structural complexity. So every subject may be and has been presented according to this plan. But just now in the elementary and the high school there is a strong movement to abandon this method, which is suitable only for experts, and not for novices in any field. We seem to be ready to agree that a novice in any subject should always begin his study with concrete phenomena, which lie close to his experience. He should be led to analyze these and see whither they tend. Whatever principles he derives and learns should be based upon these phenomena he has examined directly. Only toward the close of his study, when he has looked over the entire field, should he be expected to organize the whole material into a logical system. This is the way all sciences have been elaborated phylogenetically. The Egyptians and the Greeks worked with concrete geometry a long time before the subject was organized as we now know it. The same is true in principle of algebra, physics, botany, political economy, ethics, and so on through the entire list of subjects taught in the schools. And the point to be noted is that normal-school and college students are novices in psychology, and this should determine the manner in which the subject should be presented to them; not in the way of a logical science at the start, but concretely as they are acquainted with human nature in their daily lives. It might be better to call the course for novices *human nature* rather than *psychology*, just as children are taught *nature study* rather than *physics, biology, chemistry*, etc.

An eminent teacher of economics said recently that he had within the last two years completely revolutionized his teaching of this subject. In times past it was his custom to give students in the elementary courses a textbook presenting the principles of the subject in a logical manner. He required pupils to memorize these principles so they could recite them in class. Then he had stock problems, remote from real life, which he would give the students to test whether they could apply the principles. "But," he said, "I have lost faith in teaching economics in this way. What I do now is to make my pupils derive principles as they are actually exhibited in the life around them. I start with concrete economic data, gath-

ered from the immediate environment, rather than with definitions, as I used to do. I do not lecture any more, and I do not ask my students to learn by heart any of the laws stated in the text. The results of this method are a thousand per cent better than they were under the old régime."

Again, the writer knows a professor of ethics who has abandoned the traditional, formal method of treating the subject. It is his plan now to present to his pupils a great variety of ethical situations such as confront them in their daily adjustments. Then these are discussed and ethical principles induced. A text is used in this course, but it follows, not precedes, the concrete work. A colleague of this instructor has given up the ancient method of teaching logic by definitions and formal instances, and now his pupils are required to take the actual propositions current to-day in politics, religion, economics, and the like, and work out the logical principles involved. In this way they are led to see what is essential in a process of reasoning in order that it may be sound. Similar changes in the teaching of law, of medicine, of engineering, and so on, illustrate the evident fact that men are not satisfied with the results of the formal, and often merely verbal method of presenting the facts in any field to novices, and they are casting about for more dynamic and effective methods.

#### IV.

All unprejudiced observers must grant that the principles of educational psychology ought to be derived by the teacher from actual observation and interpretation of concrete human nature as revealed in every-day life, and especially in the schoolroom. It seems that this can best be done when the instructor sets problems which will require his pupils constantly to observe manifestations of human nature around them, to analyze their own experience, and to interpret what they find with respect to general principles, which they will gradually work out, of intellectual and emotional activity. Particular heed must, of course, be paid to the processes of learning in the most economical and effective manner. In this work it would not matter much whether pupils could define in a formal way sensation, perception, and the like, though it would be of

marked value to them if they could trace the natural history, as it were, of common ideas, noting how they have been more or less slowly wrought into shape through experience. In this work they ought to discover uniformities in the way in which ideas are built up and utilized in various typical situations presented in every-day life.

The teacher needs always to take a *dynamic*, and, it seems to me, a *developmental*, view of the human mind. He needs to conceive mental processes and products as being constantly modified by experience in adjustment to the world, and as finding their *raison d'être* in the exigencies and needs of adjustment; and his analysis of any particular processes into more elementary ones should be for the end only of noting how these latter may be altered or modified according as adjustment is promoted thereby. So far as the teacher is concerned, ideas function as wholes, and their behavior as wholes should receive chief emphasis. Effective teaching of a child does not require a static knowledge of sensation or perception, or even memory or reason. Much experience in dissecting the mature mind might be of no assistance to a teacher when he had his pupil before him, trying to help him to adapt himself to concrete situations. Many textbook psychologists are sometimes quite overwhelmed when they are called upon to explain the mental processes of people actually reacting upon the environments about them. Anatomical study of the mind as a static object is one thing, and observing its methods of operation while in action at different periods of development is an altogether different thing. Of course, this latter sort of work is so complex that the student is apt to be lost in it, so that he cannot discern any general principles unifying apparently diverse mental phenomena; but, in the language of the hour, it is up to the educational psychologists to devise methods which will make this work possible and profitable.

It will doubtless be readily granted that it is not most advantageous for a teacher who must deal with developing minds to spend all his time studying the attitudes, reactions, and interests of mature individuals. He must not be permitted to get his set while observing and interpreting the characteristics of maturity. Nine-tenths of all the teacher's study must relate

to immaturity, since teaching is concerned solely with shaping plastic, unformed minds. A number of my correspondents who testified regarding the value of their study of psychology complained that all their work related to the mature mind, while they had to deal with children. While it may be said, of course, that the principles of mental action apply to adults as well as to children, still, as the teacher must deal with mind functioning as a unity, the developing is a quite different thing from the mature mind. Some of the best students of adult psychology confess that they are in an unknown country when they have to deal with children. It is probable that child psychology is still in a very unsatisfactory condition; but it is foolish to say that nothing is known about the interests, tendencies, and intellectual needs of children as contrasted with adults.

## V.

The chief difficulty in the effective study of psychical phenomena is, of course, that they are generally so complicated that it is impossible by observation alone to detect what is really typical and essential in most of the particular manifestations of mind in or out of the schoolroom. It is the same in principle in the field of mind as of physics, say. Mere observation of complex phenomena cannot yield accurate and complete knowledge of involved matters. Aristotle made this evident, and he showed the necessity of employing a method of investigation which would enable the investigator to isolate elementary factors in complex wholes, and determine their function in these larger unities. The laboratory is designed to accomplish just this result, and it is certainly as necessary and as important in the study of mind as of nature. But the laboratory method, as it may be used in the training of teachers, must not be interpreted in too narrow a sense. It is by no means confined solely in its scope to the kind of work that must be done in the psychological laboratory proper. Physical apparatus is not essential to the employment of an effective experimental method in educational psychology, though such apparatus in the hands of a skilful operator, who knows the interests and needs of teachers, and who can choose for investigation and illustration topics that lie within the field of teach-

ing, will prove of great service. But under a competent student of mind the careful observation by a novice of a child or a group of children learning arithmetic (as a typical situation), when the specific purpose of the observer is to vary conditions so as to determine the readiness with which new facts may be assimilated, the thoroughness with which they may be retained, and the skill with which they may be utilized in practice, fully meets the requirements of a rational experimental method. I have no doubt some persons who are fond of manipulating apparatus, and who have a mathematical turn of mind, will think this latter sort of experimentation is not precise enough. They will say that the results secured cannot be exactly measured. They cannot be presented in numerical tables and charts, and so they are not of value to the teacher or to anyone else. But, so far as I am able to make out, we are a long way from the time when most of the situations with which the teacher must deal can be subjected to precise study by the use of apparatus.

I, for one, doubt whether mathematical precision can ever be attained in most of the teacher's relations with his pupils, and it would probably be a disadvantage to the teacher to get him set in the direction of a mathematical or quantitative view of mental function. The most that the use of apparatus in the laboratory can do for the teacher is to assist in impressing upon him the complexity of psychological phenomena, which he ordinarily would regard as a simple unity. But it cannot be doubted that he should devote himself mainly to the observation and interpretation of the phenomena actually occurring in the give-and-take of instruction and discipline, and social co-operation in schoolroom groups. He should get his set in this direction rather than in that which may be given in the laboratory as divorced from schoolroom situations.

The writer has seen laboratory work for teachers which was closely connected with the phenomena of the schoolroom; but surely this is not always the case. Again, the writer has heard at least one laboratory man say that what the teacher should have is a course in laboratory experiments without the slightest reference to the particular problems arising in teaching, and then when he gets before his classes he can understand

what occurs in the light of what he has got in the laboratory. A group of graduate students studying education as a major in one of the universities in this country stated to the writer that their educational psychology did not differ in fact from the work in general experimental psychology, and they could not see that it related in any way to education proper. They said physics was as close to the problems of training children as this work in laboratory psychology. Anyone who has had to inspect the work of college-trained teachers knows that they may not be able to discover any relation between their experiments in the laboratory and the situations presented in the teaching of Latin or algebra or history, or the problems involved in preventing disorder in the schoolroom. The laboratory may leave the teacher in as helpless a condition as a formal textbook, unless it takes pains to deal with the typical problems arising in teaching. At the same time it may be of great assistance if it will direct its efforts toward illuminating those aspects of mind with which the teacher is primarily concerned. Why should not the laboratory instructor spend his time with teachers upon some such matters as are indicated in Dearborn's "Psychology of Reading?" Why should not all branches of instruction be subjected to laboratory study, as reading has been? If this could be done, then the laboratory might properly occupy a more prominent place in the training of teachers than it now does. Here is a magnificent field for those who are fond of, and possess skill in the use of, apparatus in psychological study. Fortunately some good manuals of laboratory work in educational psychology are just appearing, and it is the intention to speak of these in some detail in a later article.

## VI.

Finally, a word may be said regarding the opportunity and the duty of instructors in educational psychology to make contributions to the principles of education. Theoretically, the normal school has some such duty to perform in its particular field as the engineering school, the agricultural school, the medical school, and similar institutions have to perform in their respective fields. Now, most of these latter schools feel

it is of importance constantly to explore the unknown regions in their several provinces. Needless to say, it is agreed that they must make the knowledge already securely established effective in the lives of the students whom they instruct. Happily, the schools of engineering, of medicine, of agriculture, and so on, usually maintain that they can teach what is known more successfully if they are engaged continuously in enlarging the boundaries of knowledge. To the present writer it seems apparent that one cannot be a really effective teacher of mature students unless he is striving to clarify the knowledge of any subject which he is presenting, or to apply it in new ways, or to extend it in one direction or another. Experience in endeavoring to apply knowledge or to add to it causes one to review the more critically all the knowledge which he is teaching. He sees more definitely than he otherwise could what is essential in order to give facts validity, and to organize them together into real knowledge. The instructor who never attempts to make contributions to the knowledge in his field or to enlarge the sphere of its applications is apt to acquire the information he seeks to impart in a superficial way. He is likely to be more or less of a novice himself in dealing with the knowledge he teaches. I think it can be demonstrated that the essential element in teaching is the impulse to communicate what has been discovered, rather than what has been memorized. Of course, one may feel deeply the needs of others, and this may give him a certain degree of enthusiasm in bringing to them knowledge which he himself has acquired at second hand, and which he has played no part in developing in any way. But the majority of persons having only this relation to truth are likely to be more or less pedantic and prosaic in their transmission of it to the rising generation.

At the same time it will be readily granted that one may become so absorbed in the work of investigation and the communication of his discoveries to advanced students that he may lose interest completely in making the elements of his subject effective in the lives of others, as he should do if he teaches immature individuals. Ordinarily a man who has become enamored of research wishes to transmit what he discovers to those who have passions kindred to his own, and who have



reached the same degree of development as he has himself. He finds it increasingly difficult to take the point of view of the novice, and as a consequence if he must instruct beginners his work is likely to be more or less fruitless. Such a person would be out of place in a normal school or any school of similar character. He would be of less service, probably, than the individual who should acquire knowledge merely in order that he might teach it. It will be acknowledged that there can be no place in the normal school for investigation without regard to the practical needs of teachers. But, on the other hand, if it be granted that the normal school must devote itself primarily to disseminating such facts about education as are already established, it nevertheless must be true that this work cannot be best accomplished unless normal-school instructors will endeavor to make some additions to the science or the practice of teaching.

## COMMUNICATIONS AND DISCUSSIONS.

### WINCH'S EXPERIMENTS ON THE TRANSFER OF ACCURACY —A REPLY TO L. LELAND LOCKE.

I call these few comments a reply, but I am really chiefly concerned to thank Mr. Locke for the highly appreciative remarks which appeared in the February number of this JOURNAL with reference to my pioneer experiments on the transfer of numerical accuracy. There are, however, one or two observations which may, perhaps, usefully be made.

(a) Mr. Locke suggests that interest may, to some extent, account for the degree of correlation which is found to exist between accuracy in numerical computation and accuracy in arithmetical reasoning. I should think it extremely probable that, on the whole, the children who are interested in numerical computation are also interested in the rational solution of arithmetical problems; though every practical teacher will be aware that there are marked cases to the contrary. The whole question of the relation of interest to natural capacity is of extreme importance to the science of pedagogy. Probably most of those who are in daily contact with children would agree that interest in a subject and capacity for that subject are very closely allied; though here again we are met with outstanding exceptions. Would it be wholly rash to assert that, generally speaking, interest is the "subjective" aspect of a growing capacity?

I have now experimental reason to believe (see the May number of this JOURNAL) that association is not a relevant factor in the sense in which I referred to it on page 558 of the JOURNAL OF EDUCATIONAL PSYCHOLOGY for December, 1910.

(b) The correlations found between accuracy of numerical computation and accuracy of arithmetical reasoning are, doubtless, influenced by practice effects. It would seem difficult to obviate this in working on the subjects taught in the school curriculum. Nor is it necessary if we want to know what is true under school conditions.

It will be remembered, however, that the schools were selected so as to include within the experiment different conditions of practice and efficiency for the functions measured.

The strongest argument against definite conclusions on the question of transfer from experiments like those related in the December number is the comparative shortness of time over which the experiment extends. On page 572 I said, "It is not fair to conclude from this experiment that no amount of improvement in numerical accuracy would transfer to accuracy in numerical reasoning, but only that the improvement shown in this case was insufficient to transfer. There is a presumption that it might not, since there is a clear transfer of improvement in numerical accuracy itself from rule sums to problems." But I am acutely conscious that improvements effected at high pressure for short periods are not improvements which we believe on general educational grounds to be very likely to transfer. It is the opinion of several experienced teachers in London who have helped me in my researches that improvements thus effected are not very susceptible of transfer.

(c) I have a high opinion of the Courtis tests, and am quite prepared to believe that a more completely analyzed material than that which I employed in the experiments referred to might be very advantageously used. I was especially anxious not to artificialize my procedure for the reasons given on page 568, where I say, "Doubtless some of my readers have said to themselves, 'Why not use "reckoning books," where the unit of calculation would be so much more easily estimated?' I did not do this, since it would have introduced an element of disturbance in the normal work of the children; and further, because teachers are not usually convinced by experiments which seem to them something outside and apart from ordinary school work." In England, certainly, any deviation from school conditions is usually regarded by teachers with suspicion. Rightly or wrongly, they do most undoubtedly believe that a disturbance of the ordinary forms in which mental operations are undertaken by children so vitiates the experiments concerned that the results, though interesting scientifically, are no concern of theirs. Would it be impertinent for an Englishman to suggest, from his own observations in American schools, that the American teacher is, in this respect, very like his English confrères? Whether there is any truth whatever in their contention—I incline to think there is—there can

be no doubt that it is only by moving, so to speak, along the plane of the teachers' minds that the experimenter can hope to convince them.

(d) How shall we mark arithmetical problems so as to get a system of fairly accurate units? I have used a system which calls each rational step one unit. Mr. Locke suggests that the marks should increase as the square of the number of steps. It is probable that neither method is quite satisfactory. Both methods are doubtless true in the sense that they may be quite relevant to particular purposes; but the difficulties of the problems are not entirely dependent on the number of steps, but also on the sequence and interdependence of the steps. The most satisfactory method is the weighing of the problems according to the actual performances of children who have been untaught, who have received as much instruction in one form of problem as in another.

I trust that these few remarks may be found relevant to the discussion of the questions raised by Mr. Locke. I can assure him that I fully realize both the difficulty and the importance of the issues to which he has called attention.

W. H. WINCH.

London, England.

### TESTS FOR CLASS PURPOSES AND FOR RESEARCH PURPOSES.

Recent experience in testing the mental imagery of a class in elementary psychology suggested the desirability of a few remarks on the above heading. The tests given in Betts' "The Distribution and Functions of Mental Imagery," pp. 20-24, were most used, and with great success for teaching purposes. The writer is convinced that time spent by elementary students in the laboratory practice of observing and grading images is well spent. At least half the time spent on the subject of imagination may well be spent in such interesting and enlightening introspections. The questions are admirably adapted to call forth and give opportunity for observing the different kinds and degrees of imagery.

Their unsuitability for certain other purposes, however, came out very clearly when the results of the introspections were compared with the results of another experiment. The images were graded *a* when they seemed to be as vivid or clear as a perception, and *b*, *c*, *d*

and  $c$  for lower degrees of vividness, the last meaning no images. The following values were given to the grades:  $a = 4$ ,  $b = 3$ ,  $c = 2$ ,  $d = 1$ ,  $e = 0$ , and computation made that permitted a comparison of these arbitrary units of vividness of the different types of imagery. The result gave the following order: First, cutaneous; second, kinaesthetic; third, olfactory; fourth, gustatory; fifth, auditory; sixth, visual; seventh, organic. This was very astonishing to those who had taken the test and who had supposed that the visual images were most vivid and the auditory next, instead of both being nearly at the bottom of the list.

Another experiment had been given before these results were announced in which such words as the following were spoken: Drum, mutton, piano, sugar, wind, and the students wrote the names of the images aroused in the order in which they came, and marked with a plus sign the kind of image that was most vivid. It was found that over half of the words aroused visual images first, and that they were the most vivid in nearly the same proportion of cases. It is evident that the words used gave in every case good opportunity for forming other than visual images. This confirms in a striking way the common belief that visual images are much more numerous and vivid than any other.

Why, then, did the other test indicate, as it also did when Betts used it, that visual images are not so vivid as the other kinds? An examination of Betts' questions reveals the fact that they are admirably suited to evoke every possible image of each kind. An inspection of the questions, however, shows that the greater possibilities of visual imagery are recognized in the *questions* themselves, and hence that we cannot expect superiority to be shown upon comparing the resulting figures. This may be illustrated by questions 17-20. The first question of this series calls for the vividness of the image of a familiar landscape as a whole. This is a question of the same type as all of the questions designed to evoke cutaneous imagery, which, according to the results of this test, are most vivid. In the case of visual imagery, however, the greater possibilities of analytic and detailed imagery are recognized by asking, in addition to the exact location of particular objects, the size and shape of particular objects and differences in sharpness of detail between near and distant objects. Regarding most forms of imagery other than visual, it would be impossible to formulate such detailed, analytic questions as the above.

That the vividness depends largely upon the nature of the questions, which in general favor other senses more than the visual, is indicated by the fact that the per cent. of vivid images varies but little for the twenty questions regarding cutaneous imagery, while in the visual group there are great differences. For example, question 5, as to the color of tablecloth and napkins, is marked as *a* in degree of vividness by 93 students, whereas the different shades and tints in sky and clouds are marked *a* by only 29.

It is evident from the above that the tests are admirably suited to give students laboratory practice in forming and observing the different kinds of images which they can call up, and that they are correspondingly unsuited for a research upon the *comparative* vividness of the different kinds of images. It is probable that these questions will be used by many teachers of psychology; hence it is important that attention should be called to the points mentioned above in order that wrong impressions may not be given to students.

Although it is doubtless true, as Betts says, that beginners overestimate the vividness of their images, yet it is interesting to find that almost at once they can grade their images with some confidence in their own judgments. Rarely do normal students hesitate as to how to grade the images evoked into one of five classes. It may be that this is because they actually *have* more vivid images than more mature people, and not simply because they overestimate the vividness of their mental states.

It was found that after a very little practice they could also mark the image with an *m* or an *f* to indicate whether the image was free or involved memory of a specific experience. It was found that organic and olfactory images that were vivid were more likely to involve memories, while a larger proportion of the vivid visual images were free images. Inspection of answers to special questions indicated that vividness of imagery often involved memory of rare, intense or recent experiences, but that oft-repeated perceptions, such as the color of the tablecloth, gave vivid but free images. Individual differences as to whether images are free or memory images differ greatly. With some, memories are nearly always involved, while with others images that are almost wholly free are common. A study, along this line, of persons of different ages would doubtless give interesting results.

E. A. KIRKPATRICK.

Fitchburg, Mass.

### THREE NEW CENTERS FOR PSYCHO-CLINICAL WORK IN THE SCHOOLS.

Since my recent sketch of the psycho-clinical movement, information has come of the establishment of clinical centers in the public schools of Oakland, Cal., where Miss Vinnie C. Hicks holds the position of special psychologist; in the public schools of San Jose, where Dr. L. M. Terman, of the department of education of Stanford University, plans to open a clinic; and in the schools of Cincinnati, where a clinic has been established as a result of the co-operation of the Schmidlapp Bureau, the University of Cincinnati and the Superintendent's office. The clinic is at present under the direction of Dr. Burtis B. Breese, professor of psychology in the university, assisted by Dr. Helen Bradford Thompson Woolley. Mental and physical examinations are made, particularly of children who drop out of school, and especially of those who apply for work certificates. The child's educational qualifications, his ability to earn a living, the economic conditions of the family, and the necessity for his going to work, are investigated. A Vocation Bureau is conducted for girls, and it is expected that a similar bureau will be established for boys.

J. E. W. WALLIN.

### MEETING OF EXPERIMENTAL PSYCHOLOGISTS.

The Eighth Annual Meeting of Experimental Psychologists, which was held at Cornell University April 17-19 at the invitation of Professor Titchener, was attended by some thirty representatives of thirteen institutions.

On Tuesday afternoon a session held in the educational laboratory was devoted to applied psychology. Dr. Goddard reported results obtained by the application of the Binet-Simon tests to several hundred children in the Vineland Institution for the Feeble-Minded and to some two thousand children in the public schools in the same town. These results gave convincing proof of the neatness and usefulness of this diagnostic series of tests as applied to children. Professor Angier raised the problem of the applicability of mental tests to the diagnosis of mental capacities and incapacities of normal adults, with special reference to the scientific analysis of the mental equipment of college students. The ensuing discussion developed the belief that such a diagnosis was, in principle, entirely possible.

though much yet remains to be done before reliable and directly practical prognoses may be made.

Other sessions were devoted to comparative psychology, to the problem of psychological method, with special reference to the reliability of introspection, and to reports of work in progress at the several laboratories. In this connection special interest was shown in a short talk by Professor Tschelpanow of Moscow upon the progress of experimental psychology in Russia. We print elsewhere in this issue a note concerning the building which is to house psychology at Moscow. A preliminary report by Professor Bingham upon the equipment of small laboratories showed the advisability of collecting more information on this practically important topic. At present there exists much diversity as regards the nature and value of the laboratory equipment at different institutions, as well as in the amount of the annual appropriation.

Time was also provided for the inspection of the undergraduate and research laboratories in Morrill Hall, the demonstration laboratory and the psycho-educational laboratory in Goldwin Smith Hall.

G. M. W.

#### NEW YORK STATE TEACHERS OF EDUCATIONAL PSYCHOLOGY.

The annual meeting of the New York State Teachers of Educational Psychology was held at Teachers College, Columbia University, April 20 to 22, 1911. On Thursday evening the visiting members were entertained at dinner at the Faculty Club by the department of educational psychology of Teachers College. After the dinner there was an informal discussion of the topic, "Under existing conditions, what should be the character of a normal-school course in psychology?" Dr. Bell of the Brooklyn Training School for Teachers opened the discussion by outlining the existing conditions and sketching a course in psychological study which should extend in its various modifications throughout four semesters. In the first semester the general introductory course would emphasize the study of behavior; in the second the thought processes involved in school subjects would be analyzed, perhaps under the caption of "educational logic;" in the third the psychological principles of teaching would be studied experimentally by the students, working with children in the model or practice school; and in the fourth, if devoted to practice teaching,



class and individual tests of progress in school subjects could be made, reported on and discussed. Dr. Rejall of the New York State Normal College at Albany raised the question whether, in view of the diversity of conditions, it would be desirable to attempt to standardize the work in educational psychology throughout the State. The sentiment of the meeting seemed to be against such standardization.

Friday morning was devoted to visiting educational institutions in New York City. In the afternoon Mr. Robertson of the Courtland Normal School presented a study of the dental conditions of pupils in relation to school progress, and indicated the plans for following up the study from term to term. Professor Henderson of Adelphi College outlined the results of a preliminary research on the motives for study assigned by pupils of the upper grades. The motive of social pressure, which is perhaps the most important, becomes conscious only in the highest grades. Dr. Radosavljevich of New York University reported on the investigations in experimental pedagogy in progress at that institution, and Professor Woodworth of Columbia presented evidence to show that distinct imagery types are so rarely found in school children that it is scarcely worth while to pay much attention to the supposed types in the presentation of school work.

On Saturday morning the general topic was the type of experiment that could profitably be used in normal-school psychology. Mr. Robertson discussed the status of laboratory psychology in normal schools on the basis of replies to letters of inquiry sent to all the psychology teachers of the state. A list of experiments had been drawn up from these replies and was submitted for criticism. Dr. Bell presented the list of experiments in use at the Brooklyn Training School, and discussed some of the more profitable ones. Professor Whipple of Cornell demonstrated a number of class experiments used in his course which could be readily adapted to normal-school work, and urged all present to report to him, or to some other member of the committee on class experiments appointed by the American Psychological Association, any such tests that have been found satisfactory. The discussion showed that the kind of experiments described brought the subject of psychology into more vital connection with the needs of teachers in training, and would go far to remove the objections of school authorities to experimental work.

The selection of the time and place of the next meeting was left in the hands of the executive committee.

## ABSTRACTS AND REVIEWS.

FREDERICK ELMER BOLTON. *Principles of Education*. New York: Charles Scribner's Sons, 1910. Pp. xii, 790. \$3.

This book, which deals with the biological and psychological phases of educational philosophy, will aid materially in promoting a better appreciation of the fundamental principles and presuppositions underlying a science of education. The book is comprehensive and eclectic, concrete and expanded. It aims to assemble the main results of the scientific study of education in a somewhat informal way, and is designed for a "textbook of college grade for beginners in the study of educational science." The authorities most frequently quoted are Hall, James and Ribot, and the point of view is primarily that of the Clark school of educational psychologists. There are twenty-eight chapters, which cover so many subjects that it is impossible to find a few central educational principles developing throughout the book or to discover in several cases continuity between the chapters.

The first chapter is more general and abstract than those which follow, and discusses the new interpretations of education in relation to the home, institutions, farm life, environment and primitive occupations of the school. The most general theme throughout the book may be summed up as follows: The center of reference of modern education is the child, and his prepotentiality must be studied in the light of evolution, heredity and posterity, for "education is thus recognized as a manifold process of aiding the individual to come into full possession of all the desirable features of his heritage, to minimize the undesirable ones and to initiate new tendencies" (p. 11).

Nine chapters which follow deal essentially with the phylogenetic and ontogenetic aspects of education. After a discussion of adaptation, adjustment and specialization of function in lower organisms and the anthropological and biological adaptation of human beings, the development and specialization of the nervous system are traced, with a final conclusion that the processes of evolution have not

ceased. The theory of recapitulation is then expounded from a biological point of view, and an attempt is made to establish a psychic recapitulation. Chapters V and VI explain the educational significance of recapitulation and the culture epochs theory, and insist that "at every stage the school should be correlated with life's dominant legitimate interests" (p. 107).

A somewhat general treatment of the topic from "fundamental to accessory" follows, which asserts the entire expression means "that the development proceeds from that which is relatively simple, fixed, stable and indispensable to that which is less so. Usually that which is the more fundamental is earlier developed than the accessory" (p. 120). Instincts in animals and man are then treated with some detail, and stress is laid on grasping, locomotion, expression, constructiveness, play and social reaction. There are also some speculations in regard to nascent periods, with occasional references to "paleo-psychic records of race growth and their educational significance." A study of nature and nurture follows, with an account of hereditary disease tendencies and inherited mental characteristics as evidenced by a list of noted characters who presumably inherited such traits. The chapter closes with a comparative study of the Jukes and Edwards families and a discussion of acquired characteristics.

Chapter X, on the correlation between mind and body, includes also a study of psychotherapeutics, and chapters XI and XII discuss work, fatigue, hygiene, and individual variations and differences. These chapters, as do others, contain a few original experiments.

Memory and association form the material for the following three chapters, and imitation, sensory education, imagination, apperception and motor expression in relation to education follow, with a subsequent treatment of the concept, the inductive and deductive method, the emotional life, interest, volition and moral education. The final chapter consists of a discussion of general discipline and educational values. The comprehensive field outlined is again broken up into a multitude of subordinate problems, including such interesting topics as methods of teaching, the curriculum, educational values, the daily program, examinations, mental deficiency, retardation, medical inspection, school hygiene and school excursions.

Professor Bolton's book will be of great educational and scientific significance in marking a step forward in the accumulation of educa-

tional data. The criticisms against such a book are, in the main, those of scope of material and method of presentation. The subjects are numerous and varied, but do not draw sufficiently, in the mind of the reviewer, from the fertile field of recent experimental educational psychology. Though some of the principles underlying the technique of the school subjects of reading and spelling are discussed, for example, no mention is made of the experimental work of Dodge, Judd, Dewey, Huey, Dearborn or Cornman. Search's early work forms the basis for the discussion of retardation, and no account is given of the work of the Russell Sage Foundation. Many helpful suggestions occur on mental deficiency, but the movements started by Witmer and Goddard are not cited. Though the evolution of animals is treated somewhat minutely, no mention is made of the experimental investigations in animal psychology by Yerkes, Watson, Jennings, Porter, Carr and others.

As already indicated, the subjects are not arranged in a manner which tends toward continuity of thought, or the development of correlated principles, which stand out clearly and forcibly. This is true, to a marked degree, in several chapters. At least eight chapters end with extended quotations, which leave the reader in doubt as to what specific principles or conclusions are to be derived. The topics treated are so numerous that statements introducing them sometimes become conclusions without evidence, aside from a general statement or a direct quotation. For example, "we know that the exercise of the brain causes change in the size. This is demonstrated through such experiments as those of Venn in measuring the heads of Cambridge students" (p. 324). This is based on a statement earlier in the book, which is as follows: "It is also thoroughly demonstratable that education will tend to produce this development, or lack of it cause degeneration and atrophy. Venn studied the growth of the heads of Cambridge students, and found that the heads of the best students grew longest and largest. Measurements secured before and after their university course showed their cranial growth was greater than in non-students at corresponding periods" (p. 60). Again, the difficult and complex problem of mediate association is dismissed as follows: "Inasmuch as so many ideas are continually coursing through our subconsciousness, it is not difficult to understand why curious and apparently unrelated ideas frequently arise" (p. 351). Many similar illustrations could be given, but these

will serve to indicate that it will take a great deal of experimentation and observation to verify some of the generalizations made.

There is one general method used by this author, and many others in education, which, to the mind of the reviewer, does not tend to help establish an accurate science of education. It is the method which consists in naming a list of exceptional individuals in order to prove or disprove certain supposed general principles. For example, "a few instances may be cited to show that the world's leaders in all lines of progress have either become illustrious early in life or have done the thinking which they have reserved for later expression" (p. 702), because Dickens, Ruskin, Shakespeare, Shelling, Edison, Caesar, Michaelangelo, Beethoven, etc., did this. Similarly, after citing a list of the great scientists and writers in general, it is concluded that "the high-grade intellectual ability necessary to these callings is determined by heredity" (p. 391). The same method of listing cases of agreement is applied to hereditary imagination, families of statesmen, jurists, etc. This method, which involves the logical fallacy of taking too few instances, taking only cases of agreement and involving the fallacy of accident, is then carried over to a study of the Jukes and Edwards families, where the number of vagabonds in the one and the noted descendants in the other are listed, and the conclusion reached that these differences are due to heredity, and not to environment. The following uncritical conclusion is then appended: "The rejoinder should be made that the environment in a large way was practically the same for the Juke family as for the Edwards. The periods are synchronous, and there was no great difference between New York and Massachusetts. It could have been no chance of environment which made nearly all of one family differ from all of the other. If environment were really so potent as many claim, the sameness of environment should have brought the two families as a whole to the same level" (p. 194).

The book would have been more valuable if a classified bibliography had been included, if all references to quotations had been given (cf. pp. 65, 256, 491, 521, 570, 594, 596, 660, 731), if titles of articles from which quotations are derived had been included in the references, and if the initials of authorities, especially the less prominent ones, had been given.

The mechanical construction of the book is good. The print is excellent, the tables clear and concise, and there are few typograph-

ical errors in the main text (cf. p. 34, line 6; p. 108, line 13; p. 166, line 16). The index is brief and does not contain a very elaborate system of rubrics. The following errors have been noted incidentally: The reference to Oliver Wendell Holmes should be p. 167 in place of 166; Hanus, 741 in place of 74; O'Shea, 741 in place of 743; Russell, 93 in place of 95, and no mention is made of Darwin on page 23 as indicated in the index.

On the whole, this book is indicative of much careful work and extensive reading. It is the most comprehensive treatise on the principles of education thus far published.

BIRD T. BALDWIN.

The University of Texas.

E. GAUPP. *Ueber die Rechtshändigkeit des Menschen*. Jena: Gustav Fischer, 1909. Pp. 32.

Righthandedness, which is a specifically human characteristic, has an organic basis in the superiority (Uebergewicht) of the left cerebral hemisphere over the right, probably due to the asymmetry in the arrangement of the vascular system developed in connection with the erect posture, but is usually developed as a habit.

M. J. LAURE.

University of Iowa.

JAMES PETER WARRASSE, M.D. *The Conquest of Disease Through Animal Experimentation*. New York and London: D. Appleton & Co., 1910. Pp. xiii, 176.

"The general lack of information upon the biologic sciences has been responsible for much harm. Outside of the schools of science the teaching of these subjects is but meager. \* \* \* At present the public is so poorly informed that much of its supposed knowledge concerning health and disease represents the traditions which one misinformed person transmits to another or is absorbed out of the ubiquitous literature of charlatanism."

To correct some of the current gross misapprehensions the author was moved to deliver a series of popular addresses to New York City audiences on the subject of animal experimentation. These lectures are here collected in book form and presented to a larger public. Among the topics treated are the meaning and technique of animal

experimentation, the nature and restricted character of pain, cruelty to animals, and the contributions of animal experimentation to physiology, medicine and surgery. In simple, forcible language the author shows that pain is mental, that it depends largely on the intelligence and the mental attitude of the subject, and that probably lower animals do not feel pain as we do. Many of the reactions of animals, which sensitive people imagine indicate great pain, are only unconscious reflexes. Furthermore, in most experiments there is no possibility of pain, as the operation is performed while the animal is under the influence of an anesthetic. The investigator would defeat his own ends if he were wantonly to provoke pain reactions. The author briefly indicates how all the important advances in medicine, surgery and physiology have depended directly on animal experimentation. The foolish extravagance and criminal recklessness of the so-called "anti-vivisectionists" are shown in many examples, and an appeal is made to all thinking people to inform themselves and to instruct others in regard to the facts of experimentation on animals.

"Ignorance has ever caused more pain than has searching for useful knowledge. Let us by all means be kind to animals, chiefly because it teaches us to be kind to one another; but let us in our zeal for kindness to them not neglect that which is a still greater obligation—humanity to man."

PETER STERLING.

## NOTES AND NEWS.

SELF-EXPRESSION VERSUS TEACHING.—When the writer attended the ungraded country school he had the good fortune of being under a teacher who did not know arithmetic. Fractions gave her great trouble. The pupil seized the opportunity with great avidity, trusting to himself, and “worked” every example in the three grades of arithmetic then in use. Think of it! He could do his own thinking without being interfered with and was free to go as fast as he pleased. The secret of his success lay mainly in the fact that he was given an opportunity to sink or swim at the beginning, and he found that he could swim. He found no serious break at which he needed help in arithmetic, and he found no break between the successive branches of higher mathematics. The introductions and explanations in the book were always adequate.

Moral: There is too much “teaching” and too much “lock-step” in our schools. Let the pupil work as an individual, following the natural sequences in his personal apperception, using his own most natural imagery, trusting himself and therefore trying, reaping the benefits of exercise, getting just the thing that he needs personally and setting his own pace. The evil of the lock-step system in school is not so much that it makes one child go too fast and another too slowly as in the fact that it tries to make one child learn what is entirely beyond him and another what he already knows, thus exercising a deadening effect in both cases. Our aim should be not only to have each child work at his mental level, but also in harmony with his individuality and in competitive adjustment to his associates. The teacher of the future will be a supervisor, not a drillmaster, and the school will be a little society in which each child lives a competitive part as he will later out in life.

C. E. S.

ANIMAL EXPERIMENTATION.—In view of the strenuous efforts made by the so-called anti-vivisectionists to induce the Legislature of New York State to pass a bill “regulating” experimentation on animals, Dr. Warbasse’s little book on Animal Experimentation,



reviewed in another column, deserves wide circulation. In the restrictive movement mentioned we find only fervid sentimentality, blind ignorance and wilful misapprehension run riot. The perusal of some of the literature circulated convinces one that the spirit of medieval obscurantism has not yet become extinct. We believe that much could and should be done through the teaching of physiology in the schools to secure a more general appreciation of the value of animal experimentation, and a more adequate respect and admiration for the men who devote themselves to this work. Enthusiasm for scientific research should be a characteristic of all educational endeavor, but especial esteem should accrue to investigations so vitally connected with the welfare of the human race. We rejoice that the Senate committee, after hearing Dr. Flexner of the Rockefeller Institute, and other eminent medical authorities, refused to report the bill.

J. C. B.

Some time ago the Institute for Applied Psychology (Berlin) appointed a commission for the investigation of pedagogical problems in the psychology of report. The commission, consisting of Baade, H. Gross, Grosser, Kemsies, Lipmann, Lobsien, Meumann, Frl. Oppenheim and Stern, has been doing excellent service in investigating the reports made by pupils on class demonstrations in physics. In the January number of the *Zeitschrift für angewandte Psychologie* Drs. Baade and Lipmann present a detailed account of the results of these investigations.

The University of Moscow is the fortunate recipient of a gift of 120,000 roubles for the development of a psychological institute. This sum will permit the expenditure of \$50,000 upon a building and \$10,000 upon its equipment. The plan is to erect a building of three stories and basement. The first floor will contain a large lecture-room, various offices and a museum for the display of various mental products, drawings, craftwork, anthropological material, etc.; the second floor will be devoted to a drill laboratory; the third to research, while the basement will provide quarters for the heating plant, mechanician's shop, etc. From another quarter the institute has received a library of 3000 volumes. Our readers will be interested to know that applied psychology will have at least a corner in this building. Russia is just now greeting this phase of the science

with favor. Many high schools have introduced courses in psychology, and in fifty of these small laboratories have been developed.

An outcome of the Third International Congress for Public Education, which met in Brussels August 31, 1910, was the formation of a Society for Co-education, the aim of which is to discover ways and means of undermining the prejudices which exist against co-education and to gather actual experiential data as to the working of the system. The society considers co-education as one of the most important factors in the environment which the school should provide for the child, and condemns segregation as unnatural and provocative of false relations between the sexes. It proposes to make every effort to secure for co-education a fair trial in European schools. On the other hand, Prof. Hugo Münsterberg has contributed an article to the *Ladies' Home Journal* for May 15 in which he argues, on the ground of mental and physical differences in the rate of development, against co-education and in favor of bi-education in high school and college. It would seem to us that the reaction against co-education and in favor of segregation in this country has gone far enough to render an unbiased statistical investigation of the question of considerable value. To what extent does the work done in Vassar, Wellesley, Radcliffe, Barnard or Bryn Mawr differ from that done in Harvard, Yale, Columbia or Princeton? How do these colleges compare with the co-educational institutions? To what extent is it true that the natural tendencies of young men and young women lead to a segregation of courses in co-educational colleges? Does the product of segregated high schools differ at all from that of co-educational high schools? These and many other questions regarding sex differences in education are by no means so satisfactorily settled as Professor Münsterberg seems to imply, and call for further investigation by the methods of experimental pedagogy. It will be of interest to read Professor Dewey's statement of the other side of the case in the *Ladies' Home Journal* for June.

The *Zeitschrift für angewandte Psychologie und psychologische Sammelforschung* announces a series of "*Beihefte*" or monograph supplements, which will be issued in book form similar to the EDUCATIONAL PSYCHOLOGY MONOGRAPHS published in connection with this JOURNAL. The first four monographs of the series will be Otto Lip-

mann: Die Spuren interessebetonter Erlebnisse und ihre Symptomen; J. Cohn und F. Dielfenbacher: Untersuchungen über Geschlechts-, Alters-, und Begabungs-Unterschiede bei Schülern; W. Betz: Ueber Korrelation; und P. Margis: Psychologische Analyse E. Th. Hoffmanns.

Teachers College, Columbia University, has recently published a little volume entitled "Studies in Elementary School Practice," edited by Dr. Frederick G. Bonser, which gives an account of co-operative investigations in the problems of elementary education, begun at the instigation of Professor McMurry during the summer session of 1910. All teachers are invited to participate in the movement who are prepared to study important, specific problems, for which measurable evidence can be presented.

The Dartmouth Summer School, extending from July 5 to August 17, will have as visiting instructors in the department of psychology and education Associate Superintendent Clarence E. Meleney of New York City, Dr. Cecil F. Lavell of Teachers College, Columbia University, and Prof. Edward H. Cameron of Yale University.

In addition to Professors Horne and Lough and Dr. Radosavljevic of the regular faculty, the New York University Summer School will have in its corps of instructors in education Dr. James P. Haney, director of art in the high schools of New York City; Miss Jennie B. Merrill, formerly director of kindergartens in Manhattan; Dr. Joseph S. Taylor, district superintendent, New York City, and Dr. Ernest Bryant Hoag, University of California.

The third summer session of Middlebury College, Middlebury, Vt., opens July 5 and lasts until August 11. An attractive list of courses is offered with especial reference to the needs of local teachers.

Chicago University will have the assistance of the following visiting instructors in psychology and education during the summer quarter: Prof. John B. Watson, Johns Hopkins University; Dr. Elmer Ellsworth Brown, United States Commissioner of Education; Prof. Edward C. Elliot, University of Wisconsin, who will give a course on "Educational Measurements," and President David Fellmley, Illinois State Normal University.

At the meeting of the New York branch of the American Psychological Association, April 24, the following papers were presented: George R. Montgomery: "A Simple Device for the Study of Entoptics;" J. E. W. Wallin: "The Preferred Length of Interval;" E. K. Strong, Jr.: "Sex and Class Differences in Response to Advertisements;" E. L. Thorndike: "The Curve of Work;" H. L. Hollingworth: "The Influence of Caffein on the Quality of Sleep;" W. P. Montague: "Has Psychology Lost Its Mind?" I. Woodbridge Riley: "The Spread of Christian Science," and E. W. Scripture: "Psychoanalysis and the Interpretation of Dreams."

Fred Lemar Charles, assistant professor of agricultural education in the University of Illinois, died May 6 at his home in Urbana. Professor Charles had been in poor health for some months. At the time of his death he was secretary of the American Nature Study Society and editor of the *Nature Study Review*. During the past two years he had succeeded in organizing a large number of branches of the American Nature Study Society, and had greatly extended the circulation of the *Review*. In December, 1909, he organized the first general conference on nature study and elementary agriculture. In February, 1911, he started an important movement for the instruction of children in the rural communities in nature study and agriculture, securing a special train on the Illinois Traction System (interurban) and stopping at various points in the country districts where the children could be congregated for instruction.

A recent issue of *The Texan*, a semi-weekly newspaper published by the students of the University of Texas, is devoted to education, and contains an interesting account of the work which Dr. Bird T. Baldwin is doing in establishing the department of practice teaching.

Prof. Anna J. McKeag of Wellesley College will conduct a course on "The High School" and another on "Educational Psychology" at the Summer School for Teachers, Mt. Gretna, Pa.

Dr. Friedrich Nüchter of Nuremberg, Germany, is spending several months in this country, studying characteristic movements in the field of primary schools, manual-training schools and social education. Dr. Nüchter is the author of important works on the philoso-

phy of education, and his ideas of emphasizing the development of character and personality have much in common with American tendencies in education.

Dr. Henry Neumann, of the department of education, College of the City of New York, has accepted the headship of the departments of education and English literature at the Ethical Culture School, New York City.

Prof. James R. Angell, head of the department of psychology and dean of the senior colleges in the University of Chicago, has been chosen by the board of trustees as dean of the faculties of arts, literature and science, to succeed George E. Vincent, now president of the University of Minnesota.

Dr. Elmer Ellsworth Brown, United States Commissioner of Education, has been elected chancellor of New York University.

Dr. Bruce Payne, professor of educational psychology in the University of Virginia, has been appointed president of the George Peabody College for Teachers at Nashville, Tenn. The old Peabody College has been disbanded, and President Payne will have a free field in constructing the new one, which is to have new grounds, buildings and faculty, and one million and a half additional endowment.—*Science*.

At Stanford University Lillian J. Martin has been promoted to be professor of psychology, and Rufus C. Bentley to be associate professor of education.

## CURRENT PERIODICALS.

(In this section only such articles will be noticed as bear directly or indirectly upon the interests of this Journal.)

ZEITSCHRIFT FUER ANGEWANDTE PSYCHOLOGIE UND PSYCHOLOGISCHE SAMMELFORSCHUNG. Vol. IV, Nos. 1 and 2. August, 1910. A. FRANKEN. *Instinct and Intelligence of a Dog*. 1-64. (Continued in No. 5, pp. 399-464.) One of the most careful and detailed studies of the behavior of a single animal ever published. The intelligence of the dog is in no way different in kind from that of man. The chief difference lies in the degree to which the behavior of the dog is determined by specific sensory percepts and images. RICHARD MÜLLER-FREIENFELS. *The Appreciation of Art and Its Complexity*. 65-105. A psychological analysis of the mental attitudes involved in the appreciation of music, painting and poetry. BURDE. *Plastic Art of the Blind*. 106-128. An experimental study of the abilities of blind children at modeling in clay. There were experiments in free modeling, modeling a man, modeling small familiar objects, and modeling from a copy. The experiments were tried on children with no previous training and on those who had had instruction in modeling. COLLECTIVE REVIEWS. OTTO LIPMANN. *Recent Literature on Memory and Association*. 129-152. A valuable digest of thirty-three recent books and articles on memory and association. C. ZIMMER, A. FRANKEN and F. PAX. *Recent Literature on Animal Psychology*. 152-188. Twenty recent studies in animal behavior are reviewed.—Nos. 3 and 4, January, 1911. *Reports of Pupils on Physical Demonstrations, with Especial Reference to the Educability of Report*. (Commission for the Investigation of the Pedagogical Problems Involved in the Psychology of Report.) 1. WALTER BAADE. *Method of the Experiments and Content of the Reports*. 189-311. 2. O. LIPMANN. *Temporal and Spatial Estimates, and the Results of the Questions on Color, Localization and Succession*. 312-334. This elaborate study is the most important attempt thus far made to apply the methods of the scientific psychology of report to the mental activities of pupils when they are called upon to give an account of what was done in a physical demonstration. The study will be discussed in greater detail in a later issue. COMMUNICATIONS. A. NETSCHAJEFF. *Investigations on Pupils' Capacities for Observation*. 335-346. Words, meaningless combinations of letters and pictures were exposed in a tachistoscope for varying intervals. There seems to be an antagonism between capacity to observe a number of

objects and capacity to note differences between these objects. M. H. LEM. *Children's Compositions and the Reliability of Testimony*. 348-363. The question is raised whether memory for details of an interesting experience is not better 24 hours after the event than immediately after its occurrence. After a lapse of six days, however, the details become confused and the essentials stand out more clearly than before.—No. 5. January, 1911. V. LOWINSKY. *Recent Literature on Attention*. 465-489. An extended analysis of seven important contributions to the study of attention.—No. 6. March, 1911. C. RITTER. *On Measurements of Fatigue. Critical and Experimental*. 495-545. Over thirty pages of this article are devoted to a critical survey of previous work on mental fatigue, with frequent reference to Offner's monograph on Mental Fatigue, the translation of which is announced in the Educational Psychology Monograph Series. In the experiments the author used the method of dictation, and found that the early morning hour (8 o'clock) was less favorable than the second and third periods, and that physical fatigue has no effect on mental efficiency. FERDINAND PAX. *The Psychology of Actinia in the Light of Recent Investigations*. 546-555. A summary of the work of Bohn, Jennings, Loeb, Lukas, Nagel, Piéron and others on the behavior of sea anemones.

THE PSYCHOLOGICAL CLINIC. Vol. IV. ROLAND P. FALKNER. *The Fundamental Expression of Retardation*. 213-220. Not the average per cent. of retardation for the entire school, but the maximum per cent. reached in any grade gives the best expression of retardation. LIGHTNER WITMER. *Criminals in the Making*. 221-238. By a study of a few typical cases of youthful criminals Professor Witmer shows that the same qualities which make for a career of usefulness will, when neglected or misdirected, help the child to become an intelligent and dangerous member of the criminal class. He concludes that criminal tendencies are not instinctive, and that the fault lies not with any one person or any one agency, but with society at large. WALTER S. CORNELL. *Age Per Grade of Truant and Difficult School Boys*. 239, 240. From this study, based on two hundred and thirty-six boys in the special discipline classes of the Philadelphia schools, the writer concludes that the bad boy is not a bright boy, but is two or three years or more behind his fellows. Many of these boys, if compelled to stay in school until attaining the eighth grade, would stay there a lifetime. This opens up a wide field for study concerning the personal treatment of these boys and the character of the studies for which they are best fitted. CHARLES KEEN TAYLOR. *Boys' Backs*. 274-276. Until the child goes to school regularly his spine is nearly always straight. School curvature is the name the author applies to those cases which are caused by improperly adjusted school furniture.—Vol. V. ANNA COOPER CAMPION. *Problems of the Social Workers*. 1-12. Three general classes of prob-

lems are mentioned, namely, (1) visiting homes, institutions and clinics, (2) assisting in the clinic, and (3) organizing classes for troublesome adolescent boys. The third is the most important as well as the most difficult of these problems. FREEMAN E. LURTON. *Retardation Statistics from the Smaller Minnesota Towns*. 13-19. The author reports the results of two investigations carried on under the auspices of the Minnesota Psychological Conference and the Associated School Boards of Minnesota, respectively. Besides a comparison of the Minnesota standard of retardation with Ayers' standard, the two points emphasized are the money cost of repeaters, which annually amounts to \$110,000, or 7.4 per cent. of the total expenditures for schools, and the spiritual loss, which can be measured only in terms of what the author calls that fine spirit of initiative, of progress, of growth, of self-reliance and of eagerness to achieve, which constitutes the chief glory of youth, and which sends him from school into life an effective member of society. EDWARD P. CUMMINGS. *Elimination and Retention of Pupils*. 20-23. This is another attempt to standardize a method for computing the percentage of elimination and retardation of pupils in the schools. After comparing the conclusions reached by Thorndike and Ayers, Superintendent Cummings states his own conclusions that the unit of comparison should be not the enrollment in the first grade nor in any other single grade, but the "average number belonging" for the entire school year. ARTHUR HOLMES. *Classification of Clinic Cases*. After discussing the difficulties of adopting a standard of mental measurements, the writer describes three such standards which he thinks have received sufficient endorsement to merit some notice. These he calls the individual, the social and the pedagogical, respectively.



## PUBLICATIONS RECEIVED TO MAY 1, 1911.

(Notice in this section does not preclude a more extended review.)

EDOUARD ABRAMOWSKI. *L'Analyse physiologique de la perception*. Paris: Bloud & Cie., 1911. Pp. 120. Fr. 1.50.

The author discusses the biological differentiation of neurones, the physiological correlate of a visual precept, the analysis of the physiological correlate into its elements, develops a theory of perception, and extends his explanation to the physiological substrate of associations.

W. A. AIKIN, M.D. *The Voice: An Introduction to Practical Phonology*. New York: Longmans, Green & Co., 1910. Pp. viii, 159. \$2.25 net.

This constitutes virtually a remodeled and rewritten edition of "The Voice: Its Physiology and Cultivation," published in 1900. The book is designed especially for those who are interested in the technique of training the singing or speaking voice. It does not advocate any special method, but sets forth the principles on which any valid method must be based. The volume is illustrated by numerous charts, diagrams and figures.

BAJENOFF AND OSSIPOFF. *La Suggestion et ses limites*. Paris: Bloud & Cie., 1911. Pp. 117. Fr. 1.50.

A brief history of hypnosis and suggestion is followed by a discussion of psychic automatism, a survey of the more striking phenomena of hypnotism, an account of collective suggestion and contemporary therapeutic theories, and the book closes with a chapter on the psychological mechanism of suggestion. The general conclusion is that there is nothing extraordinary about hypnotism, but that all of its phenomena accord with the laws of normal mental life.

VINCENZO COZZOLINO. *I residui uditivi verbali nei sordomuti e nei sordi*. *Giornale Internazionale delle Scienze Mediche*. Vol. XXXII, No. 6. March, 1910. 241-265.

An interesting discussion of the use which may be made of vestiges of auditory verbal impressions in the education of the deaf.

WALTER F. DEARBORN. *Experimental Education*. Reprinted from the *School Review Monographs*, No. 1, 6-13.

A plea for experimental studies in school work, a consideration of the methods of school experimentation, and a criticism of some recent investigations.

CHARLES HUGHES JOHNSTON. *The School of Education of the University of Kansas*. Published by the University, 1911. Pp. 20.

Under the guise of a discussion of the aims and ideals of the University of Kansas School of Education, Professor Johnston has given us a brief survey of the most important trends in education at the present time. He thinks that the tests borrowed from psychology do not touch the vital issues in school progress, and that we must have tests and experiments that grow out of school conditions themselves.

G. KERSCHENSTEINER. *Education for Citizenship*. Translated by A. J. Pressland for, and published under the auspices of, the Commercial Club of Chicago. Chicago: Rand, McNally & Co., 1911. Pp. xx, 153.

A translation of the fourth edition of the author's prize essay, "Staatsbürgerliche Erziehung der Deutschen Jugend." The publication of this essay in English is particularly significant at the present time in view of the clear, sane and practical perspective which it furnishes upon the problem of vocational education in our large cities. The Commercial Club of Chicago deserves the gratitude of American educators for arranging for the translation and publication.

SHERMAN C. KINGSLEY, Editor. *Open-Air Crusaders. A Story of the Elizabeth McCormick Open-Air School*. Chicago: Open-Air Crusaders, 51 La Salle street, 1911. Pp. 112. 50c.

This, attractively constructed, richly illustrated little book gives an excellent account of the work done in the open-air schools of Chicago and other American cities. There is a good bibliography of open-air school literature.

EDNA LYMAN. *Story Telling: What to Tell and How to Tell It*. Chicago: A. C. McClurg & Co., 1910. Pp. xii, 229.

A book of unusual merit, dealing chiefly with the type of story that appeals to children in the intermediate and early grammar grades.

GEORGE B. MANGOLD, Ph.D. *Child Problems*. New York: The Macmillan Company, 1910. Pp. xv, 391. \$1.25 net.

This volume is part of the "Citizen's Library of Economics, Politics and Sociology," and aims to give "a general view of the principal social child problems of today. Its four parts treat of child mortality, child labor, the delinquent child and recent educational reform. This last includes play and playgrounds, medical inspection, the education of backward children, and "the new education." The treatment is straightforward, the perspective good. Many chapters will be valuable as assigned reading for students in education.

W. McDougall. *An Introduction to Social Psychology*. Boston: John W. Luce & Co., Third Edition, 1910. Pp. xvi, 366.

The third edition of a book that has been particularly important in its treatment of the emotions and sentiments and their relation to the instincts.

*Pädagogisch-Psychologische Arbeiten. Veröffentlichungen des Instituts für experimentelle Pädagogik und Psychologie des Leipziger Lehrervereins. Band I. Leipzig: Alfred Hahns Verlag, 1910. Pp. 208.*

This important volume contains an introductory sketch of the Leipzig Institute for Experimental Pedagogy and Psychology by Paul Schlager, a discussion of experimental pedagogy by Max Brahn, an extended experimental investigation of language instruction for the deaf and dumb by Rudolf Lindner, an elaborate study of attention span and the perception of number by Frank N. Freeman, the description of a pendulum tachistoscope by G. Deuchler, and an article on new apparatus for experimental investigations by Rudolf Schulze. The book presents interesting and valuable material, which will receive more extended notice in a subsequent issue.

MELBOURNE STUART READ, Ph.D. *An Introductory Psychology, with Some Educational Applications*. Boston: Ginn & Co., 1911. Pp. viii, 309. \$1.

The author does not claim to have made new contributions to the science, but has aimed at a simple, interesting, non-technical exposition, with special reference throughout to the reader's own experience and to the problems of teaching and learning. The author's system, so far as he has any, is obviously eclectic. In general, the treatment follows the present-day 'adaptation psychology,' but is interlarded with Titchenerian structural concepts. Each of the fourteen chapters closes with references to three or four other texts. The nervous system gets 20 pages.

*Report of the Commissioner of Education for 1910, Vol. II.* Washington: Government Printing Office, 1911. Pp. xxvi, 663-1373.

In addition to the usual tables of school statistics, this volume of the Commissioner's report contains an introductory section by Prof. George Drayton Strayer treating of the collection and interpretation of educational statistics. Among the forms recommended are a pupil's record card, which will give uniform information concerning the pupil's entire school life, and a financial report for city school systems containing 82 items.

J. E. WALLACE WALLIN. *Spelling Efficiency in Relation to Age, Grade and Sex, and the Question of Transfer. An Experimental and Critical Study of the Function of Method in the Teaching of Spelling.* Educational Psychology Monographs. Baltimore: Warwick & York, Inc., 1911. Pp. 91. \$1.25.

An interesting and valuable study in experimental pedagogy. The work of Cornman and Rice is subjected to a searching criticism, and the advantage of definite training in spelling is clearly demonstrated. It is a book that will be widely read by elementary school principals and teachers.

J. E. WALLACE WALLIN. *Human Efficiency.* Reprinted from Pedagogical Seminary, XVIII, March, 1911. 74-84.

A plan for the study of the personal, social, industrial, school and intellectual efficiencies of normal and abnormal individuals. A companion article to "The New Clinical Psychology and the Psycho-Clinicist," which appeared in the March and April numbers of this JOURNAL.

FREDERICK LYMAN WELLS. *Some Properties of the Free Association Time.* Reprinted from the Psychological Review, XVIII, January, 1911. 1-23.

An analysis of the mental processes underlying "free association" reactions.

FREDERICK LYMAN WELLS AND ALEXANDER FORBES. *On Certain Electrical Processes in the Human Body and Their Relation to Emotional Reactions.* Archives of Psychology, XVI, March, 1911. Pp. 39.

The various facts noted tend to support the view that sweat-gland activity is the most important factor in the causation of electromotive changes in the body.

W. H. WINCH. *When Should a Child Begin School? An Inquiry Into the Relation Between Age of Entry and School Progress.* Educational Psychology Monographs. Baltimore: Warwick & York, Inc., 1911. Pp. 98. \$1.25.

In another column Dr. Gulick states that one of the fundamental questions in education, about which we have much opinion but no verified knowledge, is that in regard to the age at which a child should enter school. Inspector Winch has subjected the question to careful investigation, and presents the results in this monograph.

Peter Sandiford

## A SCALE FOR MERIT IN ENGLISH WRITING BY YOUNG PEOPLE.

EDWARD L. THORNDIKE,

*Teachers College, Columbia University.*

An ideal scale for merit in English writing would consist of a series of compositions (1) which range from one that possessed zero merit to one that possessed the utmost possible merit, (2) whose respective amounts or degrees of merit were exactly known and whose nature was such that other compositions could be compared with them easily.

Such a scale would obviously be of great value to teachers, civil-service examiners, college-entrance boards, scientific students of education and any others who need to measure the merit of specimens of English writing in order to estimate the abilities of individuals or changes in such abilities as the result of mental maturity, educational effort and other causes.

The best service toward establishing such a scale is the provision of an approximate scale by the extension, amplification and refinement of which more and more adequate scales may be devised. In this work Mr. M. B. Hillegas and I are at present engaged. ~~Certain results so far obtained are presented~~ in this article, partly because of their intrinsic value, and partly because it will be of interest to the readers of THE JOURNAL to criticize them and so aid in the improvement of the scale.

The best introduction to what follows will be for the reader to himself make the following experiment:—

Examine the following specimens and rank them in order for what you regard as merit in English writing by young people. Number the worst specimen 1, the next worse 2, the next worse 3, and so on. Then let the four-inch line below represent the total difference in merit between the specimen which

you rank 1, or worst, and the specimen which you rank 18, or best, and place the letters designating your numbers 4, 7, 10, 13 and 16 at appropriate points, so that the distances between these points represent the respective differences in merit between 1, 4, 7, 10, 13, 16 and 18 in your judgment. Then decide what sort of English writing would possess zero, or "just not any," merit as writing by young people and locate this zero-point where it belongs on the line or an extension of it.

(a) When Sulla came back from his conquest Marius has put himself consul so Sulla with the army he had with him in his conquest seized the government from Marius and put himself in consul and had a list of his enemys printy and the men whoes names were on this list we beheaded.

(b) Ichabod Crane was a schoolmaster in a place called Sleepy Hollow. He was tall and slim with broad shoulders, long arms that dangled far below his coat sleeves. His feet looked as if they might easily have been used for shovels. His nose was long and his entire frame was most loosely hung to-gether.

(c) My dear Fred,—

I will tell you of my journey to Delphi Falls, N. Y. There is nice scenery along this route. The prettiest scene is in the gulf which is quite narrow, a small creek flows down it and the road follows along near its banks.

There are woods on either side, these trees look very pretty when they are white with snow.

In summer it is always shady and cool in them and the small fish may be seen darting back and forth in the water.

I hope I will have the pleasure of taking you over the route some time.

Yours sincerely,

(d) As we road down Lombard Street we saw flags waving from nearly every window. I surely felt proud that day to be the driver of the gaily decorated coach. Again and again we were cheered as we drove slowly to the postmasters, to await the coming of his majestie's mail. There wasn't one of the gaily bedecked coaches that could have compared with ours, in my estimation. So with waving flags and fluttering hearts we waited for the coming of the mail and the expected tidings of victory.

When at last it did arrive the postmaster began to quickly sort the bundles, we waited anxiously. Immediately upon receiving our bundles, I lashed the horses and they responded with a jump. Out into the country we drove at reckless speed—everywhere spreading like wildfire the news, "Victory!" The exhilaration that we all felt was shared with the horses. Up and down grade and over bridges, we drove at breakneck speed and spreading the news at every hamlet with that one cry "Victory!" When at last we were back home again, it was with the hope that we should have another ride some day with "Victory."

(e) The most popular man of Auburn was the preacher. Although he had a very small salary he was contented. The preacher was kind to everybody. Little children loved him. Old soldiers liked to sit by his fireside and tell stories of the battles, which they had fought in. The beggars who came to his door, although chided for leading such an existence, were always clothed and feed.

The preacher was always willing to go to the homes where there was sickness or death. Here he helped in all things that he could.

In the church he preached with unaffected grace, and all who came to scoff at him remained to worship.

The minister was a contented, simple and kind man, whom the people loved.

(f) As far as I can learn from the Essay on Burns, Mr. Carlyle considers that good poetry must contain the sincerity of the poet. The poem must show the author's good choice of subject and his clearness of sight. In order to have good poetry the poet must be familiar with his subject and his poem will show it.

The characteristics of a great poet, in Mr. Carlyle's opinion were sincerity and choice of subjects. A poet must be appreciative of nature and have a responding heart. Carlyle says a true poet does not have to write on subjects which are far away and probably come from the clouds. A truly great poet makes the most of subjects which are familiar to him and close to earth, as Burns did in his poems to the Field Mouse and to The Daisie.

(g) I had an early run in the woods before the dew was off the grass. The moss was like velvet and as I ran under the arches of yellow and red leaves I sang for joy, my heart was so bright and the world was so beautiful. I stopped at the end of the walk and saw the sunshine out over the wide "Virginia meadows."

It seemed like going through a dark life or grave into heaven beyond. A very strange and solemn feeling came over me as I stood there, with no sound but the rustle of the pines, no one near me, and the sun so glorious, as for me alone. It seemed as if I felt God as I never did before, and I prayed in my heart that I might keep that happy sense of nearness all my life.

(h) dere techer :

I like schol not like schol. that man other place like make work tools. Some day you say I rede

(i) First: De Quincys mother was a beautiful women and through her De Quincy inherited much of his genius.

His running away from school enfluenced him much as he roamed through the woods, valleys and his mind became very meditative.

The greatest enfluence of De Quincy's life was the opium habit. If it was not for this habit it is doubtful whether we would now be reading his writings.

His companions during his college course and even before that time were great enfluences. The surroundings of De Quincy were enfluences. Not only De Quincy's habit of opium but other habits which were peculiar to his life.

His marriage to the woman which he did not especially care for.

The many well educated and noteworthy friends of De Quincy.

(j) They were in fact very fine ladies ; not deficient in good humour when they were pleased, nor in the power of being agreeable when they chose it, but proud and conceited. They were rather handsome, had been educated in one of the first private seminaries in town, had a fortune of twenty thousand pounds, were in the habit of spending more than they ought, and of associating with people of rank, and were therefore in every respect entitled to think well of themselves, and meanly of others.

(k) The passages given show the following characteristics of Fluellen: his inclination to brag, his professed knowledge of History, his complaining character, his great patriotism, pride of his leader, admired honesty, revengeful, love of fun and punishment of those who deserve it.

(l) Our school room is on the side of the school house and it is a awfully nice room and I like it because it is so nice and all the boys like it, there is a good

many pictures on the wall and there is a clock on the wall. We like this school room and come to school most all the time.

(m) Dear Sir: I write to say that it aint a square deal Schools is I say they is I went to a school. red and gree green and brown aint it hito bit I say he don't know his business not today nor yeaterday and you know it and I want Jennie to get me out.

(n) the book I refer to read is Ichabod Crane, it is an grate book and I like to rede it. Ichabod Crame was a man and a man wrote a book and it is called Ichabod Crane i like it because the man called it ichabod crane when I read it for it is such a great book.

(o) I words four and two came go billa gumi sing hay cows and horses he done it good he died it goon I want yes sir yes sir oxes and sheeps he come yes sir camed and goes billum gumun oomunn goodum.

(p) Advantage evils are things of tyranny and there are many advantage evils. One thing is that when they oppress the people they suffer awful I think it is a terrible thing when they say that you can be hanged down or trodden down without mercy and the tyranny does what they want there was tyraus in the revolutionary war and so they throwed off the yok.

(q) I think the sunlight is very beautiful on the water, and when it shines on the water it is very beautiful, and I love to watch it when it is so beautiful. The colors are so pretty and the noise of the water with the sunshine are so attractive in the sunshine I wonder do other people love to watch the water like I do. I dont know as there is anything as lovely as the water waves in the sunlight of the glorious orb.

(r) I want to say it aint no youse they aint got no right and they aint got no man  
ban tan pan pan san san sen sen sun sun tun tun

This experiment is suggested primarily as the quickest and clearest introduction to what follows, and as of interest because it permits the reader to compare his own personal judgments with the average judgment (to be given later) of nearly two hundred competent judges. But I beg the reader, having thus made his independent judgments, to cut out or copy the blank on the opposite page and send it as directed.

The hypotheses upon which the scale is constructed are the following:—

1. Two specimens of English composition, A and B, are equal if, among competent judges, just as many judge A to possess more merit than B as judge B to possess more merit than A. If all judges are forced to express a preference, equality in merit means 50 per cent. of preferences. Specimen r is thus judged about equal to specimen s, being judged better 51, and worse 56 times by 107 judges.



I rank the specimens as follows:—

<i>a</i>	<i>is</i>	<i>No.</i>	.....	<i>g</i>	<i>is</i>	<i>No.</i>	.....	<i>m</i>	<i>is</i>	<i>No.</i>	.....
<i>b</i>	"	"	.....	<i>h</i>	"	"	.....	<i>n</i>	"	"	.....
<i>c</i>	"	"	.....	<i>i</i>	"	"	.....	<i>o</i>	"	"	.....
<i>d</i>	"	"	.....	<i>j</i>	"	"	.....	<i>p</i>	"	"	.....
<i>e</i>	"	"	.....	<i>k</i>	"	"	.....	<i>q</i>	"	"	.....
<i>f</i>	"	"	.....	<i>l</i>	"	"	.....	<i>r</i>	"	"	.....

*I locate my grades 4, 7, 10, 13 and 15, and the point of just not any merit as English writing by a person in his 'teens, as shown below:—*

*Name,*

*Address,*

*Please send this, or a copy, to E. L. Thorndike, Teachers College, Columbia University.*

2. The differences between C and D and between D and E are equal if, among competent judges, forced to express a preference, the per cent judging C to possess more merit than D equals the per cent judging D to possess more merit than E. Specimen d is thus approximately as far above specimen b as b is above k, 151 out of 180 judges calling d better than b, and 146 of them calling b better than k.

3. Within certain limits and approximately, the difference between F and G bears a relation to the difference between G and H, as shown in the following table:—

TABLE I.

The relation of the amount of difference in merit between x and y to the frequency of judgments that "*x is better than y*," only judgments "*x better than y*" or "*x worse than y*" being allowed.

(8) I from thre ours up in room on books and books care for childer tore a page and rite on them

Percentage of judges regarding $x$ as better than $y$ .	Amount of superiority of $x$ to $y$ , 100 equaling that amount which causes 75 per cent of the judges to judge $x$ as better than $y$ .	Percentage of judges regarding $x$ as better than $y$ .	Amount of superiority of $x$ to $y$ , 100 equaling that amount which causes 75 per cent of the judges to judge $x$ as better than $y$ .
50	0	75	100
51	4	76	105
52	7	77	110
53	11	78	114
54	15	79	120
55	19	80	125
56	22	81	130
57	26	82	136
58	30	83	141
59	34	84	147
60	38	85	154
61	41	86	160
62	45	87	167
63	49	88	174
64	53	89	182
65	57	90	190
66	61	91	199
67	65	92	208
68	69	93	219
69	74	94	231
70	78	95	244
71	82	96	260
72	86	97	279
73	91	98	305
74	95	99	345

For example, specimen  $h$  is judged by 80 out of 107 judges, or 75 per cent, to possess more merit than specimen  $r$ ; and  $r$  is judged to be better than specimen  $o$  by 76 of the 107 judges, or 71 per cent. By the table, then,  $h$  differs from  $r$  by + 100, and  $r$  differs from  $o$  by + 82;  $h-r = 100$  and  $r-o = 82$ .

I need not here discuss the basis, in theory and experiment, for Table I. Common sense informs us that if  $J$  is judged better than  $K$  by 90 out of 100 judges and  $K$  better than  $L$  by only 70 out of 100, the difference  $J-K$  is greater than the difference  $K-L$ . Table I informs us *how much* greater, supposing certain facts about the causation of individual differences in judgment to be true. On any defensible view whatever of these facts,

the table is approximately valid so long as we use it only to compare differences of about the same amount.

With 180 judges, the results were, for some of the specimens above:—

g	better than d,	142	or	79% ;	g	worse d,	38	or	21%.			
d	"	"	b,	131	"	73% ;	d	"	b,	49	"	27%.
b	"	"	k,	126	"	70% ;	b	"	k,	54	"	30%.
k	"	"	q,	148	"	82% ;	k	"	q,	32	"	18%.
q	"	"	a,	119	"	66% ;	q	"	a,	61	"	34%.
a	"	"	p,	138	"	77% ;	a	"	p,	42	"	23%.
p	"	"	n,	128	"	71% ;	p	"	n,	52	"	29%.

The following relative differences calculated from Table I are approximately correct by any defensible method of calculation. One hundred equals the degree of difference noticed correctly by 75 per cent of judges:

g-d	=	120
d-b	=	91
b-k	=	78
k-q	=	136
q-a	=	61
a-p	=	108
p-n	=	82

The difference between n and zero merit is found, in a way that I shall presently describe, to be approximately 180. Sample m is on the whole regarded as of zero, or 'just not any,' merit as English writing by a young person.

In so far, then, as the judges are competent, the specimens a, b, d, and so forth have amounts of merit as follows:—

g	=	857
d	=	737
b	=	646
k	=	568
q	=	432
a	=	371
p	=	262
n	=	180
m	=	0

The location of the zero point for merit in English composition by young people is of importance in order to allow the '*times as much*' merit judgment. Measures of fatigue, practice or change of any sort will be greatly facilitated if we can so arrange the scale that 8, 10 and 12 on it mean twice as far from just not any of the thing in question as 4, 5 and 6—that 240 means twice as much of the thing as 120, three times as

much as 80, five times as much as 48. Hitherto no one could say with any assurance whether specimen g was two, ten or a hundred times as 'good' as specimen q.

I have located it approximately as specimen m on the basis of the judgments of (1) nine men of special literary ability, five professors of English, four being authors of standard textbooks on composition, and four men of marked general intellect and literary ability; (2) eleven gifted teachers familiar with secondary education, and (3) eight psychologists familiar with the significance of scales and zero points in the case of intellectual abilities and products.

Although no one person of these had any deliberate criterion for the point where positive merit just begins, and although one's first reaction to the request to locate such a point is to regard it as arbitrary, there is much agreement amongst individuals and almost perfect agreement in the case of the averages of the three groups.

Of the twenty-eight judges, two regard zero merit as something below the least meritorious specimen of the list, and five put it higher than specimen p, but three-fourths of the judges locate it as not lower than specimen o or higher than specimen n. The central tendency of the twenty-eight puts it at specimen m.

It is beyond the scope of this article to comment on any facts obtained in the course of the derivation of the scales. But it will interest students of individual psychology and of the teaching of English to learn that the worst writing actually found by us amongst our 5000 excerpts from answers to examination questions written by pupils in the upper grammar and high-school grades is, by our scale, little below 400. The best found in the same series is under 800. Zero merit being defined by the consensus of impartial experts, the best paragraph by a pupil in his 'teens is little over twice as good as the worst paragraph produced by any high-school pupil. To get grades from 400 down it was necessary to make artificial specimens. To write an English sentence that intelligently, tho' very offensively, expresses an idea of any complexity, means apparently progress nearly half way from zero to the limit of achievement for a pupil in his 'teens.

## WILLIAM JAMES' CONTRIBUTIONS TO EDUCATION.

BIRD T. BALDWIN,

*The University of Texas.*

The purpose of this paper is to call attention to the fundamental educational theories of Professor James\*, and to show that his writings are in a large measure responsible for the present-day predominating empirical and experimental approach to this subject.

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\*This teacher and philosopher, who died on the 28th of August, 1910, was born over sixty-eight years ago, January 11, 1842. After a somewhat irregular educational training, due to the temporary residence of his father in various portions of Europe, James finally entered upon his university life at the age of seventeen as a student of the University of Geneva, where he remained for one year. He then returned to America and spent one year studying art at Newport, Rhode Island, with Mr. William M. Hunt, and two years at the Lawrence Scientific School at Harvard, where he studied in particular anatomy and chemistry. He then attended the Harvard Medical School for two years; in 1865 went for a year's excursion to Brazil with Agassiz, and on his return to Berlin for a year's work in physiology. He then returned to work in the zoological laboratory at Harvard with Agassiz, and later received his M. D. degree in 1869. His educational wanderings, like his later writings, help to characterize a romantic temperament which freely relied on natural aptitude and intuition rather than on formalism and disciplinary training.

As a teacher James' professional life was accompanied by similar shiftings of educational orientation, though he remained on the Harvard faculty for thirty-five years, from 1872 to 1907. For the first three years he was an instructor in physiology and anatomy, and then assistant professor of physiology for four years. During this period he gave regular courses in psychology with experiments, and established in 1875 the first psychological laboratory in America. This honor has been assigned heretofore to G. Stanley Hall, who started a laboratory at Johns Hopkins in 1883. James lectured at Johns Hopkins in 1877-78 on psychology, and Dr. Hall received his degree from Harvard in 1878; so he and Royce, who was a fellow at Johns Hopkins in 1877-78, were students of James. During this period, 1876, James began with Thomas Davidson, the Scotch philosopher, to make annual camping trips to the Adirondacks, where some rough houses were built among the brooks, forests and mountain valleys, which were frequented by a little group of philosophers, among whom, in addition to James and Davidson, were W. T. Harris, Bakewell and Angell. Years later when James was in a sanitarium at Nauheim in 1890, recovering from a severe nervous breakdown, Dr. Putnam of Boston wrote him in regard to a pleasant walk they had taken together along the side of Round Mountain in the Adirondacks. James replied, saying: "Your talk about Keen Valley makes me run all over with homesickness. Alas, that those blessed heights should henceforward probably be beyond my reach altogether! It is a painful pang."

From 1880 to 1885 James was assistant professor of philosophy in Harvard.

It does not fall within the province of the paper to characterize the elements of the style of this great writer, who brought the abstract study of psychology from the classrooms of a few metaphysicians and divinity students and placed it in an interesting and fascinating form in the minds of thousands of people of this country and abroad—all this without sacrificing the scientific integrity of the subject, but, on the contrary, adding to it. He had a literary style which brought him into close touch with all who read him, and more so with those who have talked with him or heard his rich, sympathetic voice. His simplicity and modest and ardent sincerity won him friends wherever his name was known; his freedom from dogmatism and prejudice, and his love for truth and fair play brought him in closest touch with the greater scientists and philosophers, and his approachable, friendly, happy manner, together with his desire to see the good in a fellow, caused him to be loved by all his students, as hundreds will testify. It has been said that he helped more young men find themselves than any other philosopher or educator in this country. Royce, speaking of an interview in 1877, says: "James

during which time he helped to organize the American Society for Psychical Research. He was then professor of philosophy for four years, professor of psychology for four years, and professor of philosophy again from 1897-1907. From 1907 until his death he was lecturer in philosophy at Columbia, Oxford and Harvard and occupied his spare time in writing. The last time he spoke to a public audience was at the Clark 20th anniversary in September, 1909, where he looked so natural and seemed in such splendid spirits that he was a great inspiration to our meetings.

James was a prolific writer. About one year ago I began to make a list of all his writings, and at present I have ten books—he also edited two books, one hundred and twenty-eight different magazine articles and seven signed book reviews. Several of the magazine articles were reprinted in other magazines or in foreign journals. A similar list has been published in the *Psychological Review* since this article was written.

James was honored by degrees from the Universities of Padua, Princeton, Edinburgh, Harvard, Durham, Oxford and Geneva. He was a member of the National Academies of America, England, Germany, Denmark, France, Italy, Prussia and Russia; he was president at one time or another of the American Psychological Association, the American Philosophical Association, the American Naturalists, and at the time of his death president of the International Psychological Congress. (For several of the above facts the writer is indebted to an excellent biography by Professor Perry in the *Harvard Graduates' Magazine* for December, 1910.)

Space will not permit the mention of the details of James' life in his delightful home in Cambridge, where some of us have been welcomed into the marvelous library and have talked with him and Mrs. James as friends, for both were always "warm friends and charming companions." James was a man very fond of his home and his family, and "he cared greatly for his students."

found me at once, made out what my essential interests were at our first interview, accepted me with all of my imperfections as one of those many souls who ought to be able to find themselves in their own way, gave patient and willing ear to just my variety of philosophical experiences, and used his influence from that time on, not to win me as a follower, but to give me my chance. It was upon his responsibility that I was later led to get my first opportunities here at Harvard. Whatever I am is in that sense due to him." (Harvard Graduates' Magazine 18, 631.)

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The passion of love may be called a ~~power~~ monomania ~~in~~ to which all of us are subject, however ~~some~~ otherwise sane. It can co-exist with contempt and even hatred for the 'object' which inspires it, ~~but~~ <sup>and</sup> whilst it lasts the whole life of the man is altered by its presence. M'Fie describes the symptoms of <sup>his</sup> unusually powerful inhibitory power ~~with~~ <sup>with</sup> his abnormally excited impulses to words a century ago.

"Contemplable in my own eyes, I continued to  
"wear my disagreeable fustian, I fell into such a  
"State of melancholy as would if long continued, have  
"inevitably have led to insanity or death. I continued  
"to wear my disagreeable fustian till towards the end of  
"January 1775 when my rage, which had hitherto  
"of been restrained within bounds broke forth with  
"the greatest violence. On returning one evening from the  
"Opera (the most insipid and tiresome amusement in

From a portion of the manuscript of James' *Principles of Psychology*, II, p. 543. (Loaned to the writer by E. L. Thorndike.)

Thorndike says in the preface to his *Elements of Psychology*: "To Professor William James I owe the common debt of all psychologists due for the genius which has been our inspiration and the scholarship which has been our guide. \* \* \* I owe also a personal debt for unfailing kindness and encouragement, which can only be acknowledged, never repaid." Professors Angell, Dewey, Harris and Jastrow speak of his helping them and many others. Mr. Henry Rutgers Marshall writes: "But for his interest in some crude work of mine in my youth, and before we had ever met, I should probably never have discovered that I had in me the capacity to think or write anything that might be worthy of the attention of any psychologists."

James was a good teacher. He applied the spirit and methods of his psychology to his teaching, and we always found him presenting the good rather than the bad, the correct rather than the incorrect, going from the simple to the complex, the known to the unknown, the concrete to the abstract. Before his class he was a friend and leader who assumed the attitude of appreciation, sympathy, co-operation and helpfulness rather than antagonism and harsh criticism. He was always stirring up problems and following them out. He not only assigned problems for his students to consider, but frequently gave an important comprehensive examination question to the class three or four weeks before the examination. James' lectures and recitations were usually informal and of a conversational nature; he would walk into the room, take his seat, begin talking about the subject and soon all members of the class were eagerly taking part in the recitation by asking questions or entering into the discussion. His strongest points as a teacher were that he made his students think because he was thinking, and that he treated each topic with such richness, vividness and intensity that it became the most important and interesting topic of the year. He always was so ardently sincere and earnest that on one occasion he was forced to say: "As I write this special topic seems to me the most important in the subject, and when I come to another chapter that will seem so, too." In short, he adopted in his classwork, as in his



writings, the romantic point of view which thrilled the imagination and led one on into unexplored regions.

The three books by James which have influenced education most are his *Principles of Psychology*, *Briefer Course* and his *Talks to Teachers* which contains several addresses first delivered before semi-popular audiences. James' first book, and, I might add, his greatest work, *Principles of Psychology*, was published in 1890 in two volumes. As originally planned, there was to be one volume, and to meet a later demand for a smaller book, the *Briefer Course* was published in 1892. At the present time there have been twenty editions of the *Principles* published and thirty-five of the *Briefer Course*. The *Principles* has been translated into Italian and Spanish, and the *Briefer Course* into Russian, Japanese, German and French. The *Talks to Teachers on Psychology and to Students on Some of Life's Ideals* was published in 1899, and there have been twelve printings. This book has been translated into German, Italian and Russian. In his *Talks to Teachers*, James says: "I have found by experience that what my hearers seem least to relish is analytical technicality, and what they care for is concrete, practical application." The *Talks* were given at Cambridge in a series of twelve lectures under the title, "Talks on Psychology of Interest to Teachers," beginning October 27, 1891. The lectures were given, according to the university calendar, on successive Thursdays, except the first lecture, which was given on Tuesday. Professor Hanus of the Educational Department of Harvard attended some of these lectures, and he writes me that the audiences were large and appreciative.

These *Talks*, together with his *Principles*, were the first books to make serious inroads on the scholastic faculty psychology, to establish the method of introspection on a scientific basis and to bring modern psychology into the school-room and apply it to the every-day problems of the aim of education, the pedagogical significance of instinct, play, habit, motor responses and manual training, the signification of imitation and suggestion, methods of arousing interest and developing voluntary attention, the necessity of routine, the need of effort, the transfer of training, the value of discipline.

methods of punishment, the meaning of marks, the evils of cramming, the methods of the recitation and methods of teaching, the limitations of object-teaching, the value of school-room observation, individual differences, the basis of moral training and the relation between teachers and pupils.

In the introduction he modestly claims that 'knowledge of psychology will aid the teacher by narrowing the paths of experiment and trials; by giving a knowledge in advance that certain methods will be wrong; by making clear what the teacher is trying to do; by giving confidence and respect for methods based on sound principles and theory, and by fructifying independence and reanimating interest through a knowledge of *how* children learn.' Some students, no doubt, have been disappointed by this somewhat modest claim when psychology was being proclaimed as a panacea for all educational ills, but others read further and found that not only were the claims made good, but an insight was given into a hundred different details in teaching, and the appetite grew by the inspiration on which it fed.

There are a few presuppositions underlying James' treatment of education which must be clear at the outset of our discussion, since his influence has been largely of an indirect form through his psychology, his students and his personal touch with the popular mind.

In the first place, his educational contributions are so intricately bound up with his psychology that it is impossible adequately to treat the one without the other, no matter which we are discussing. His educational theories and practices are based on his psychology, and his psychology adopts throughout his entire treatment of the subject the functional point of view which is essentially the point of view of the present-day educators. He is, in short, primarily, though not exclusively, an educational psychologist.

Among the most important presuppositions underlying his educational psychology are those of the relation of mind and body, where he theoretically accepts the view of the interaction of the one with the other, although he inconsistently accepts for practical purposes the final conclusion of the psy-

chophysical parallelist that there are no psychoses without corresponding neuroses.

The second point of view maintained throughout his educational theory came through his psychology from his earlier interest in anatomy and physiology, namely, the biological point of view, which says, "Man is a practical being whose mind is given him to aid him in adapting him to this world's life."

The third fundamental principle is derived from his emphasis on motor consequences of ideas—a principle formulated in his mind as early as 1879, when he began to emphasize the teleological conceptions of mind in certain directions and said, "We are acquainted with a thing as soon as we have learned how to behave toward it." The foundation principle of his little book on *Talks to Teachers* is, "There is no reception without reaction, and no impression without correlative expression, and this is the great maxim which the teacher ought never to forget." This principle leads finally to a consideration of the problem of knowledge. The relation of the mind and body does not fall within the province of this paper: the biological conception of education, the significance of reactions and the meaning of truth will be discussed briefly.

James shifted the aim of education to the biological point of view. Plato had emphasized the moral aim; Socrates, the dispelling of error and the discovery of truth; Aristotle, happiness through perfect virtue; Luther, service to the state and church; Spencer, preparation for complete living; Herbart, a many-sided interest; Harris, the reciprocal help between men, but James said, "Education is the organization of acquired habits of conduct and tendencies to behavior." By tendency to behavior he, of course, meant instincts. Practically no one had mentioned instincts in relation to education previous to 1890, and James was the first educator to call direct attention to the native resources of the child and the place these native tendencies to reaction must necessarily have in any scheme of education in which children are concerned. He immediately proceeded to analyze and elaborate instincts and habit, and the chapters on these subjects in the three books mentioned above are classics. There has not been

a reputable book in educational psychology published since James' *Principles* that has not devoted several pages or chapters to instinct.

Man, for James, has a greater variety of instincts than have animals, but he also unfortunately says in one short sentence, "Man possesses all the impulses [instincts] they [animals] have, and a great many more." This, of course, can hardly be proven, but it is the sentence quoted most frequently by educators, and is, I believe, somewhat misleading. Instincts, as I understand James' point of view, are latent inherited impulses to acts of a reflex type which serve a purpose, the acts ceasing to be blind after having been repeated. They are sometimes variable and transitory, ripening and fading away at certain ages, as creeping, for example. Some are intermittent, appearing, disappearing and reappearing, as shyness. Others are permanent and persist after once appearing, as imitation. Among the special human instincts are laughing, crying, sneezing, hiccoughing, modesty, etc. James mentions over forty instincts with the view of showing how, "in a perfectly rounded development, every one of these instincts would start a habit toward certain others." This is the basis of the educational theory of James, and this has been the prevailing spirit of most educators during the last two decades. These instincts need careful conscious direction on the part of the parent and teacher; they need organization, otherwise they would be destructive; they need controlling, otherwise they would run riot; they need developing, otherwise they would not serve their full purpose. James epigrammatically says, "In education we must strike the iron while it is hot." I think that he derived these suggestions from his great teacher, John Locke, who, though knowing nothing perhaps of the instincts and speaking two hundred years earlier, said, "We must observe children carefully for 'favorable seasons of aptitude and inclination,' and teach the child when he is in tune." *Some Thoughts Concerning Education*, Par. 74.

Some of the direct changes wrought by James' treatment of instinct, which first appeared in *Scribner's* in 1887, have been an enrichment of the course of study, giving an opportunity for an appeal to the various instincts as they appear at

different stages of the child's life; a decided increase of emphasis on play and the wise use of the collecting instinct in geography, history and other subjects; the significance of the manual arts; the need of the objective and experimental methods, and the significance of instincts in discipline. He says, "Of course, the proper pedagogic moment to work skill in and to clench the useful habit is when the native impulse is most acutely present. Crowd on the athletic opportunities, the mental arithmetic, the verse-learning, the drawing, the botany, or what not, the moment you have reason to think that the hour is ripe. The hour may not last long, and while it continues you may safely let all the child's other occupations take a second place. In this way you economize time and deepen skill, for many an infant prodigy, artistic or mathematical, has a flowering epoch of but a few months." The Darwinian theory of the origin of instinct is accepted, it being denied that they are inherited habits, for "that adaptive changes are inherited we have as yet, perhaps, not one single unequivocal item of positive proof." *Principles I*, 688.

James' view on instincts have had a marked influence, though indirectly, on the social sciences, especially ethics and sociology. Among the many recent writers in ethics no one has followed James more closely than MacCunn, who bases his *Making of Character* on instincts as the more deeply-rooted sources of virtue, while his debt to James for the treatment of habit is more marked, saying, as he does, "There is but one step from admiration to appropriation." President King quotes James favorably no less than thirty-two times in his small volume of 259 pages, *Rational Living*. MacDougall, in his recent *Social Psychology*, follows James directly, and holds that instincts are the leading factors in "determining human conduct and mental consequences."

Bagley bases his *School Management* on instinct and habit when dealing with the routine factors of education, and Thorndike, in his *Principles of Teaching*, which starts where James left off, has done most to bring James' psychology into practical use in education, taking up in more systematic manner the wise use and direction of instincts in the schoolroom.

The strongest argument opposing this point of view of bas-

ing education on instincts has been presented by Judd, who, as an intellectualist, says, when refuting MacDougall's views, "I agree with him (MacDougall) when he holds that human life can be explained only by psychological principles. I do not agree with him when he minimizes intellect as distinguished from instinct. I do not sympathize with him at all in his attempt to bring human action back to the fundamental formula of all animal behavior. Human behavior is not aimed at maintaining oneself within the environment; it is aimed rather at complete remoulding of the whole environment, and the chief instrument in this process of remoulding is intellectual comparison and deliberation, not emotion. \* \* \* We have been in some doubt in the past as to whether society is based on instincts or ideas. We have talked about our institutions, but studied them as if they were mechanical. Our whole treatment of human life has been biological rather than psychological. I believe that the period of biologizing human life is over. We shall lose none of the advantages gained from a study of reflexes and instincts if we recognize that they are primitive phases of human organization and less significant than higher conscious phases. We shall understand the productive forms of activity better if we recognize them as related to intelligence, which is the consummate product of evolution." (*Evolution and Consciousness*, Psychol. Rev., 17, 89 and 97.) These two opposing contemporary views are now being subjected to close scrutiny for empirical evidence by psychologists and educators, and as a result we are accumulating data which will aid in developing a science of experimental education.

It was but one step from instinct to habit for James, and his chapter on "Habit" is decidedly the best that has so far been written. President Faunce has well said, "It has been preached from a thousand pulpits." In his treatment here James took the psychological dispositions and vibrations set forth so ably by David Hartly in 1792 and explained them in the neurological terms of the times. Habits have a physiological basis depending on the plasticity of the nervous system, and to quote indirectly, they should be cultivated because they simplify our movements, make them more accurate and diminish fatigue and the necessity of conscious attention. There-

fore, "The great thing in all education is to make our nervous system our ally instead of our enemy," and, "for this we must make automatic and habitual, as nearly as possible, as many useful acts as we can. \* \* \* Launch yourselves with as strong and decided an initiative as possible. \* \* \* Never suffer an exception to occur until the new habit is securely rooted in your life. \* \* \* Seize the first opportunity to act on every resolution you make, and on every emotional prompting you may experience in the direction of the habit you aspire to gain. \* \* \* For no matter how full a reservoir of maxims one may possess, and no matter how good one's sentiments may be, if one have not taken advantage of every concrete opportunity to act, one's character may remain entirely unaffected for the better."

The neurological conception of habit was applied in a far-reaching manner in his early chapters on the "Association of Ideas," which appeared in essay form in 1880, and also as Angell, one of his most thorough students, was indicated in the relation of habitual action to will in an article written the same year.

James' chapters, both in his *Principles* and in his *Talks*, are filled with results of many important experiments which have direct bearing on education in the subjects of attention, imagination, apperception and motor expressions. These discussions tended to develop an experimental attitude in education, which during the last three years has made rapid strides toward the scientific solution of practical problems. Among the contemporary problems which may be traced directly to James is that of transfer of training or the so-called doctrine of formal discipline. James' opposition to this doctrine had its origin in some experiments on memory which were made previous to 1880, and which led him to conclude that "no amount of culture would seem capable of modifying a man's general retentiveness." This is again very similar to one of Locke's statements when he says, "The learning of pages of Latin by heart no more fits the memory for the retention of anything else than the graving of one sentence in lead makes it more capable of retaining other factors." The difficulties with Locke's conclusions are that he made no experiments or

tests. The difficulties with James' conclusions are that he made too few experiments. Hundreds of others have tried various forms of experiments, and all acknowledge certain limitations with reference to the general conclusions. President Lowell attacked the problem from an objective point of view by studying two groups of college students in the medical school and law school, and concluded that college excellence in history was but of little assistance to high standing in the law school, and that the same was true of science in the medical school. Too many writers who have discussed this topic have attempted to solve it by means of arm-chair discussions or by means of what I might call an ego-centric line of argument, which runs somewhat as follows: "*I studied one or two subjects for the disciplinary value, I can apply my learning to other lines of activity, I am a success; therefore, the method is a success, and is applicable to everybody.*" This problem, which is being studied in a careful scientific way by a large number of educational psychologists, still contains a few residual factors involved in the transfer of practice and the elimination of identical elements which remain unexplained.

There are many other contributions which James made; for example, his treatment of emotion, which was published in *Mind* in 1884, revolutionized current theories by saying that emotion was the result rather than the cause of bodily changes, a statement which roughly means that we are sorry because we cry rather than cry because we are sorry. James later retracted this bold thesis—that the emotion is the bodily changes—but the chapter has given us a remarkable insight into the feeling aspects of child life, and has tended to emphasize the value of correct habits of posture and attitudes for both teachers and pupils.

James held, as has been shown, the biological point of view in education and the functional point of view in psychology. He accepted the interaction of mind and body, but practiced the view of psychophysical parallelism. He continually emphasized the motor expression of ideas and their teleological significance, and adopted the empirical experimental attitude. But he went further, and vigorously opposed the current educational theories of the latter part of last century which were



transplanted from Herbartian soil by DeGarmo, Harris, Tomkins and the earliest writings of the McMurrys. These theories became a part of the warp and woof of our educational literature, and placed the "ends and means" of education in logical entities known as "concepts," which again were logically (not psychologically) bound up with the culture epoch theory and the vague term of *apperception*—the password for admission into the circle. The theory was formal; these concepts frequently degenerated into meaningless terms on a monistic basis, and the students who failed to grasp the real meaning of the concepts found Education merely the juggling of names without meaning or practical significance. James had said in the preface to his *Principles*, "The reader will in vain seek for any closed system in this book," and he rebelled against any formal concept-building theory. He temporarily destroyed the term *apperception* by one master stroke, and it is just beginning to return with some definite connotation. He turned directly from the meaningless concepts, abstractions, verbalism, closed systems and pretended absolutes to the consequences of ideas, motor expressions, concreteness, facts, power. In short, he adopted as early as 1879 a new method which said that the best method is to try to "interpret each notion by tracing its respective practical consequences," the Pragmatic method first outlined by Mr. Pearce. The method says, "Our conception of the effects, whether immediate or remote, is then for us the whole of our conception of the object so far as that conception has positive significance at all;" therefore, in education we must give more attention to responses—motor, intellectual, emotional, spiritual reactions. The practical consequences are the important things, for "pragmatism is uncomfortable away from facts." It is an empirical attitude, which rejects bare abstractions in education and looks toward consequences and differences. That it is not an appeal to superficial activity and efficiency is shown throughout James' *Meaning of Truth*.

The second fundamental principle of this view of education is based on an epistemology which asks the question, "Does the idea work? If so, we have truth," for "true ideas lead to things that will work," and education must be such that "con-

sequences useful to life must flow from it." Education is the result of development from within and without, and the truth is made during the growth and experience of the child. This gives us a genetic theory of truth, and such views oppose the development of formal concepts and open up a whole new field for our experimental study and application of *the expression of ideas*.

The third essential point in understanding the pragmatic trend in education is to be found in the principle underlying *science*, i. e., while there is always "an unfinished seeming front," there is always "a linking of things together." More *continuity* in education will be the natural outcome of the pragmatic method, as outlined in the chapter on The One and the Many in *Pragmatism*. *The lack of continuity is the greatest weakness in contemporary educational practice.*

Whether James is responsible for the development of the pragmatic trend in education, or whether the pragmatic trend in philosophy and education is responsible for the development of this philosopher and teacher, I am unable to say, but "this marriage of fact and theory" as continually expressed in his psychology, his education and his pragmatism "is endlessly fertile." This is where the emphasis will be placed during the next decade which will mark the formative stage of the science of experimental education. As outlined in this paper, James' contributions to education center, in the main, around his analysis of the human mind, how it acquires and assimilates knowledge, and the nature of truth.

## A RATIONAL COLLEGE MARKING SYSTEM.

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### I.

There is but one foundation for rational grades, or marks, where the grades are based upon such knowledge as an instructor in college possesses, and that is *a correct conception of the dignity of the work required by the institution in question.*

The system of grades may be interpreted numerically for particular purposes, as, for example, the assignment of honors resting on scholarship only, but it is desirable that the instructor, especially the young instructor, should not know the number equivalent.

The teacher who has a correct appreciation of what a college grade means will determine by the above criterion whether a student's work is of passing grade, and he will not base his conclusion upon the fact that the student made 83 or 85 in a given examination; if the work done has the proper dignity, the man passes. A rational marking system is only a method of determining the proper division or place in the grading system to which he is entitled.

The crux of the entire matter is that college men measured on intellectual standards group themselves according to definite laws; and the unfairness and inequalities in any marking system generally come from incorrect distribution made by the instructor. It is probably the truth that the vast majority of instructors have no system of distribution; in fact, have never thought that there was any such law in existence. A correct distribution does not mean that we can tell at the beginning of a semester's work just how the men in a class will

stand at the close of the semester, but it does mean that there is a certain ideal distribution toward which the marks will converge and to which they come ever nearer as the sum total increases.

If all men of any race could be grouped according to mental capacity or mental ability, they would be distributed according to the Gaussian Law of Error. It should be noticed that the distribution suggested is one of *mental ability*, and not *mental accomplishment*. The individual variations among the highest and the lowest would be much larger than among the average or median individuals. We should find that in one hundred individuals selected at random the extreme individuals might differ as much as one-seventeenth of the entire range, while the individuals grouped about the median would have a variation of only about one two-hundred-and-fiftieth part of the range. In other words, the hundredth man may be expected to differ from the ninety-ninth by nearly fifteen times as much as the fiftieth man will differ from the fifty-first. (*Cf. Biometrika*, Vol. I, p. 390.)

College men have greater mental accomplishment than the average man, but, measured from the standpoint of mental ability or capacity, they are not a group so highly specialized as is commonly believed. This is especially true in America, where the colleges are filled with students drawn from every walk in life. The distribution, then, of college grades, when properly assigned, will satisfy practically the normal error curve. The instructor must recognize that there is a marked difference, as said before, between ability and accomplishment.

The grades or divisions in a rational marking system must be designated by letters or symbols, and the letters or symbols used should, in general, never stand for the initial letter of any word that can be applied to the grade. The use of *A* for the average, or *M* designating the median, might be allowed, but even then they are objectionable, while *I* to indicate inferior or *F* meaning fair, is under no circumstances to be accepted. The use of a letter standing for a word immediately involves, in the mind of the instructor, the interpretation of the word with all its complicated shades of meaning. The grades merely designate groups and, in their interpretation,

are not to be defined by numerical limits. To say, for example, that *L* denotes that group of students whose grades lie between 75 and 85, at once introduces artificial boundaries involving the unsolvable problem, what do 75 and 85 mean as grades?

The most satisfactory grading system is to use five distinguishing groups which are here designated by *A*, *B*, *C*, *D* and *E*, the letters indicating the grades in order from the highest to the lowest.

The system will center itself about the average or median designated by *C*, for, as said above, the system must have clearly-defined groups, and the average *C* furnishes the means of uniquely setting off the groups, so that there can be no possible quibble as to their limits.

In proceeding now to formulate the definitions that shall outline the various groups, it is necessary to define the average group *C* first, since this group is the key to the system. The average group *C* is not determined by numerical standards, but is defined as follows:

*Group C* will include within its limits *in the long run or in the average of a large series* one-half of the entire number of grades given.

*Group B* will include those students whose work is superior to that represented in group *C*, but is not of the highest distinction; this group will include within its limits in the long run 15 per cent. of the entire number of grades given.

*Group D* will include those students whose work is inferior to that represented in group *C*, but whose work is worthy of unconditional credit; the group will include within its limits in the long run 15 per cent. of the entire number of grades given.

*Group A* will include those students whose work is characterized by excellence and is manifestly superior to that of group *B*; this group will include within its limits in the long run 10 per cent. of the entire number.

*Group E* will include those students whose work is clearly below that of group *D*, and who should, only after repetition of the work in the class or the performance of certain additional assigned work, receive a specific position in one of the

other groups; this group will on the average or in the long run include 10 per cent. of the entire number of grades given.

## II.

It may be well to add a few facts that should be borne in mind in the application of the above law of distribution. The percentage of the total number of grades that will fall into each group as given above is to be understood as only approximate, for the exact limits will never be attained in practice. Should the grades given by any instructor coincide perfectly with the ideal distribution given, this fact would be proof that he did not understand the principles of the system; and, on the other hand, should his markings, when taken in the aggregate, fail to approximate to the given law, it would be sufficient cause for investigation. It is evident that a large class, in any subject, should show a distribution of grades closely satisfying the above law, while a small class, of say, five students, may or may not agree with the theoretical grouping. This method of grouping will not apply as rigorously to first-year men as to upper classmen. Many failures during the first year in college are due to inequality in preparation; besides, it may be noticed that many students are in college from no real desire on their part. These failures do not result from lack of mental ability, but from indifference, and are not, therefore, to be classified under the law of error.

Many instructors maintain that a system of college grades is a subject of no great importance, and contend that it is a matter of mere detail hardly worthy of discussion. In many respects this contention is quite true, but the system of grading must be fair, or the results are not just when it is born in mind that certain honors, such as election to Phi Beta Kappa, and even appointment to graduate positions, are based in the majority of colleges upon the relative markings of the candidates. The great growth in our colleges with the corresponding increase in the instructional staff, and the presence of many young and inexperienced instructors in the large departments, make the need of a marking system capable of uniform interpretation a necessity if the colleges are to keep these

methods on an equality with boasted progress in scientific pedagogical ideas.

A fair and just distribution of college grades on the part of an instructor is not at all the same thing as impartiality in assigning grades. Rational grades imply both impartiality on the part of the instructor and a uniform system of distribution. No system will give the instructor divine insight into mental capacity and accomplishment, but it should furnish him the proper foundation on which to base a judgment, so that the results shall be subject only to chance errors, which will be largely eliminated in the aggregate.

A number system is the correct method in assigning grades, dependent upon examinations, which rest upon principles similar to civil-service examinations. The examination here does not cover a certain course given by the examiner, but is a measure of the mental development of the candidate along definite lines. Such tests demonstrate only ability to solve certain problems which, from their character, are supposed to indicate capacity to perform demanded technical duties.

Those who have given the matter of grading but little or no consideration are likely to think that a number system is perfectly fair and in every way satisfactory were it not so troublesome. Such a system would be fair if every student took the same work under the same instructors, as is the case in some small technical schools, but, with a large number of electives and with students taking required work under different teachers, the personal equation of the teacher will render the system unfair. Those who are using number systems and who think themselves quite clear as to the meaning of numerical grades will find, if they enter into discussion of the subject with their co-workers, that each one has his own particular interpretation. To illustrate this diversity of interpretation: Suppose the passing grade of a college is 75 per cent. What does this mean? Does it mean 75 per cent. of perfect work, or 75 per cent. of the best any man can do; or again, does it mean that of the questions given in examination 75 per cent. are answered? Most instructors probably use the last interpretation, and the query may be raised—Can the instructor give such models of examination that the percentages of the ques-

tions answered shall be an exact measure of the work done by the student?

There is, as has been said before, only one system of grades that can be used by an instructor, and that is a system that rests upon a correct conception of the work required by the institution, and is independent of numbers. Ability on the part of the instructor to assign grades with fairness involves a conception of the laws of individual variation within the group of individuals to be classified. The problem of individual variation has been solved in its most general form, both by Karl Pearson and W. F. Sheppard (*Biometrika*, Vol. 1, p. 390), and any system of college grades that does not take these individual variations into account will neither rest upon rational grounds nor be just to students in its application.

If we group all men of any race according to mental capacity, we have a symmetrical curve extending to infinity at either end; this curve will be accepted by practically all as satisfying the Gaussian Law of Error. If the selection is limited to college students, the curve will be infinite above, but limited as to the lower range, and the curve, then, for this distribution might be expected to appear decidedly skew. The author wishes again to call attention to the great difference between *ability* and *accomplishment*. Although but a small proportion of high-school graduates take a college course, it is fair to assume that the majority of such graduates have mental ability sufficient to take such a course, and a large percentage of the students who do not finish the high school would, if given a fair chance and encouragement, be capable of development and completing a college course. The point then is, while the college men have more intellectual development—and from this standpoint the frequency curve is that of a highly-selected group, from the standpoint of mental ability—they by no means represent so specialized a group. This point the writer would emphasize: The distribution of college grades is by no means a measure of mental accomplishment, but a measure of mental capacity; therefore, the distribution is practically normal.

The weakness exposed by Professor Cattell in his reference to the entrance examinations at Columbia University (*Pop.*



*Sci. Mon.*, Vol. 66, p. 374) is, I believe, largely due to the false grade given by such methods. These entrance examinations are only a measure of memory and mental accomplishment. The fact that there was practically no correlation between these entrance examinations, and the later work of these men in the university shows that, at least for the men considered, the test did not give a measure of mental ability. Many men of high mental ability but low mental accomplishment, due, perhaps, to poor secondary school work, barely pass the entrance tests. Later, in the college work, where the grades are largely mental estimates and include both ability and accomplishment, these same men reach standards that have no correlation with their entrance examinations. The work of Professor Dearborn, published under the title, "The Relative Standing of Pupils in the High School and in the University of Wisconsin" (Bull. University of Wisconsin, 1909), showing that the relative standing of high-school pupils practically remains the same through the university is, I believe, a proof of this contention.

In most discussions along this line considerable stress is laid upon the distribution of grades, on the assumption of equal range for the successive groups. Such a grouping does not recognize the law of individual variation, and, therefore, the deductions from this method are unsatisfactory, and do not give rise to a rational classification.

An institution, adopting what has here been called "A Rational Marking System," must arbitrarily adopt the limits for the groups selected. That is, the faculty must determine whether the median shall include 40 per cent or 50 per cent or some other number, whether the failure group shall be one in ten, and so on, for each of the groups.

The problem is almost entirely one of definition, and since there must be no ambiguity in definition of the median in terms of which the other groups are defined, the median should be taken as including one-half of the total number of students. The failure of approximately one-half of the students, in the long run, to attain this mark would mean one of three things—a poor teacher, too severe marking or an exaggerated idea on the part of the instructor of the preparation of the students

admitted to the course. An excess of students in the median would show in general that the work required was not up to the standard of the men taking the course.

Some instructors will claim that the advanced classes are made up of highly-selected groups of individuals, especially where admission to the course is dependent upon the permission of the instructor, and that for such classes the law of distribution does not hold. The answer is that, while the law does not apply to the small individual class, it does apply in the aggregate.

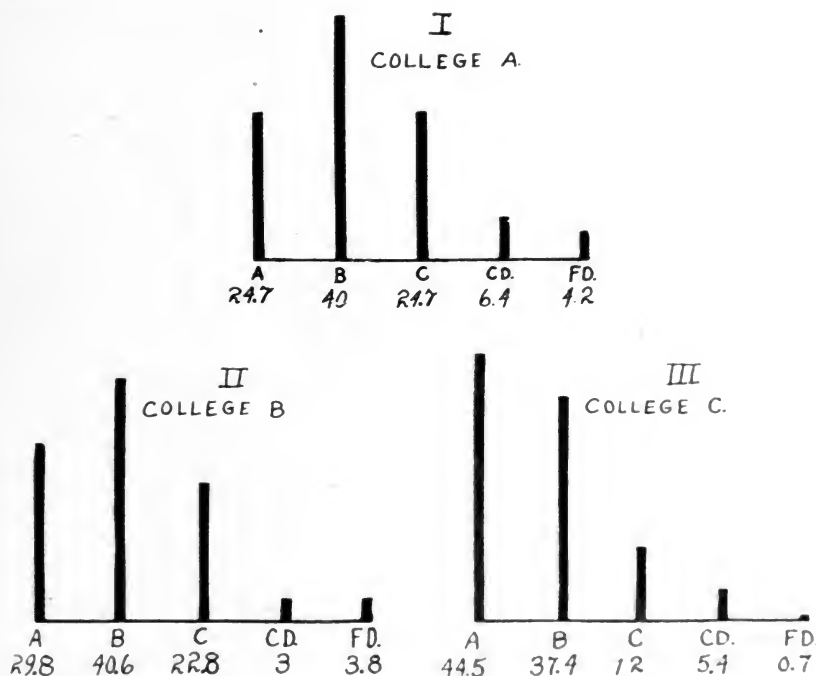
The class may have exceptional ability, yet if the course given is to be a true college course, it must be of such a grade as to require high mental effort; it must become more exacting and more advanced; the problems studied must be more general and demand greater grasp and breadth. If the course does not require such effort, and if it does not present mental difficulties, then it ceases to be university work.

The question as to whether a marking system shall consist of three, four, five, seven or any other number of groups is debatable, but, by a process of exclusion, the most rational number of groups is found to be five. A system of three groups is open to the objection that it furnishes no distinguishing mark of excellence unless the middle group is made so large as to be open to all criticism that can be urged against a "pass" and "not pass" method of grading. A series of four groups, through lack of symmetry, fails to give a clearly-defined median about which a rational system must be centered if clean-cut definitions are to be given. A five-group system is symmetrical, furnishing opportunity for distinctions that are readily drawn and clearly recognizing the problem of individual variation. The inherent difficulties in drawing fine distinctions render undesirable the use of marking systems consisting of more than five groups.

The method followed in various colleges of requiring a student to remove a low grade by a higher one, or, as it is called, balancing a lower by a higher mark, is an unfortunate one, as it attaches a stigma to the lower mark. It has been emphasized above that the marks should have no numerical interpretation; they should only represent clearly-defined groupings.

The instructor is made to feel that in giving the lower mark he is imposing a penalty, and he will hesitate to give the mark, even though his judgment tells him it is the proper one. A rational marking system will never place an instructor in the position of wondering how any grade given will affect the student's standing with respect to any other grade he may receive.

It may be said in conclusion that common sense demands that teachers shall cease to use methods in the grading of students which experience has shown to be open to harsh criticism. The failure to apply rational scientific methods to our grading systems merely contributes to the general belief that the college professor is a man of theoretical and not of practical ideas.



A few plates are added which will illustrate what has been brought out in a number of papers on this subject, namely, the actual discrepancies and lack of uniformity found in marking systems in use at the present time, where the law of in-

dividual variation is not taken into account, and where each instructor interprets the system according to his own understanding of it.

The nine plates given are examples taken from the different colleges and departments in the University of Iowa.

Plates I-VII show a system of three passing grades, combined with a "conditioned" and a "failure" group. Plates I, II and III, based on over 25,000 grades, give the distribution of grades in three of the colleges. These three plates show such different interpretation of standards as to be irreconcilable with one another.

Plates IV, V and VI are three departments in one of the above colleges; in each case the department is large, and the results rest on sufficient numbers to exclude chance variation.

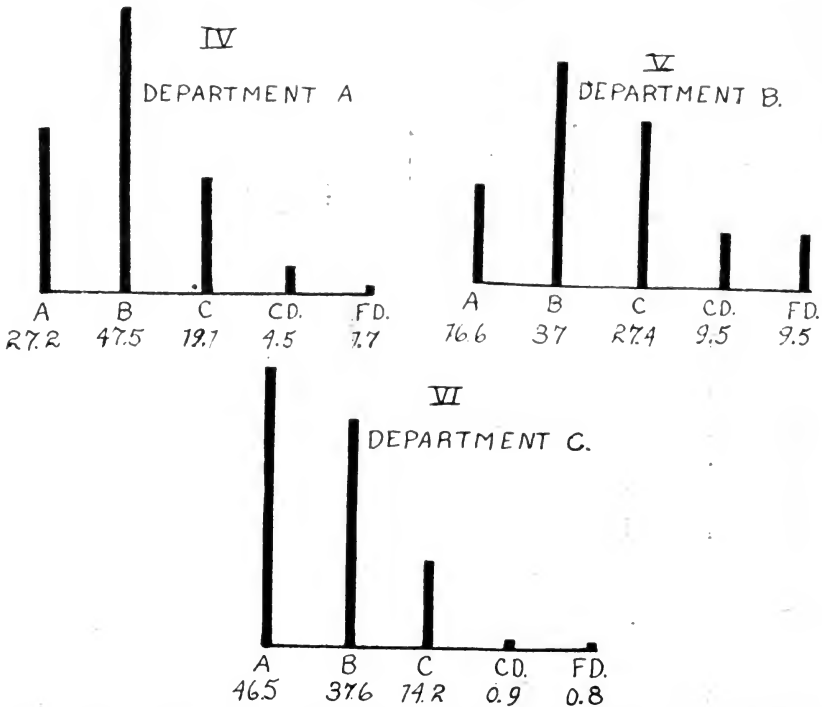


Plate VII gives the distribution of grades in one section of 141 students, and the distribution would indicate that there was lack of ability on the part of the instructor either to teach

or to understand the principles of a fair grading system. Plate VIII is the distribution of over 26,000 grades in the College of Liberal Arts under a system of seven groups, where the grades had a definite numerical interpretation.

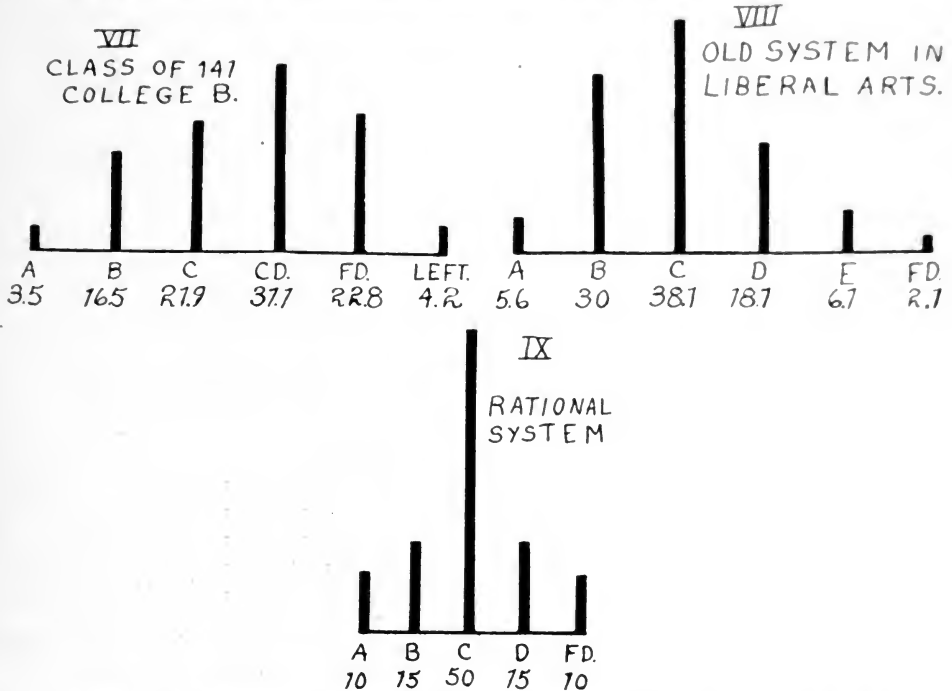


Plate IX shows a normal distribution of five groups, as explained above for a rational system. The plates are drawn as though the groups had equal ranges, but it must be borne in mind that such is not at all the case; the plates show *relative frequency* only, and not range. Plate IX will, without doubt, seem at first glance an abnormal distribution to those who have not questioned the usual systems of marking, but, in light of the absolute necessity for clearness in definition, the writer believes it will recommend itself on further study by the reader.

These plates indicate discrepancies that may be found in greater or less degree in all of our largest institutions. This fact in itself is proof that a rational marking system is highly desirable.

## COMMUNICATIONS AND DISCUSSIONS.

### THE NATIONAL EDUCATION ASSOCIATION, SAN FRANCISCO, JULY 8-15, 1911.

In any survey of the general trend of the San Francisco meeting two measures stand out prominently as indicative of the present policy of the Association. In the first place a larger appropriation was made for purposes of educational research than has been the case for several years. Heretofore there has been some complaint that, although large sums of money were spent annually, little or nothing was devoted to the furtherance of studies in education. Whether or not this complaint was justified, the new board of directors promptly indicated their attitude by appropriating a total of \$6200 for educational investigations. This sum is to be expended as follows:

Committee on uniform educational statistics.....	\$500
Articulation of high schools and colleges.....	300
Compilation of new geometry syllabus.....	300
Conservation of vision.....	500
Rural schools and school systems.....	1,000
Committee on time and education.....	300
Cosmopolitan high school curriculum.....	300
Teachers' salaries and living expenses.....	3,000

While several of these appropriations are for investigations already in progress, those for rural schools and for teachers' salaries are newly authorized. Both of these investigations are timely, and will serve to awaken interest in other important questions of educational policy which need careful study.

Secondly, the set of resolutions adopted by the Association indicates an appreciation of the scientific attitude in attacking educational problems, and a recognition of the present status of experimental pedagogy and school hygiene. The substance of the more important of these resolutions is as follows:

1. The members express their hearty appreciation of the great progress made by the national bureau of education under the able leadership of Commissioner Elmer E. Brown, and pledge enthusiastic support to his successor,

Commissioner Philander P. Claxton, in his work of extending the service of the bureau. They ask Congress to increase the appropriation to the bureau, so that additional investigations may be made, and that the salary of the commissioner may be increased.

2. It is recommended that definite moral instruction be introduced into the school program.

3. "The Association favors all measures which will tend to safeguard the health of the growing child. Among them must be reckoned proper attention to school hygiene in all its applications; proper medical inspection and the co-operation of boards of health in the matter of sanitation and contagious disease; the extension of the use of school grounds, and, in large cities, of school roofs as playgrounds, open air gymnasia and school gardens; the establishment of open air schools and of forest and farm schools, and the furtherance of physical exercise in formal arrangement and in sports and games commensurate with the powers and needs of the growing body in its successive stages."

4. It is urged that school buildings and grounds be opened to the wider use of the public for social and educational purposes under proper safeguards and control.

5. "*Resolved*, That the school age limit of each individual child be determined by requiring the child to meet physical and mental tests, even though the child be in years above the age standards; in other words, a child's actual age should be determined by physio-psychological data corresponding to the normal standard for the age limit required by law. All children or persons failing to meet such maturity test at the extreme school age limit should remain under public supervision and control, either until they reach maturity or permanently."

6. It is recommended that vocational training and advice be given pupils in the schools.

7. "The success of woman in the field of higher education during the last generation demonstrated her intellectual quality and placed her on a level with her brother. Up to this time she has been following the traditions of man's education, in many instances of an antiquated type; but the time has now come for a new differentiation. While no essential difference exists in the mental value of the sexes, there exists a difference in mental and emotional quality and in social function. This Association, therefore, recommends that this difference be recognized in courses of study and methods of training for our girls and young women."

8. "*Resolved*, That the president of the National Education Association be authorized to appoint a committee consisting of seven active members to consider and report to the Association its findings and recommendations concerning the salaries, tenure and pensions of teachers, the committee to take into consideration among other things the increased cost of living, the increased professional demands upon the time, strength and funds of teachers, and whether the increase in teachers' wages has kept pace with the increase in the wages of other workers, the increase in the cost of living and the increased demand upon teachers.

"*Resolved*, That the board of directors of this Association be and hereby

is instructed to set aside and appropriate from the current funds of the Association the sum of \$3000, the same to be used, or so much thereof as may be necessary, for the purposes of the investigation and report as directed herein."

At the opening session of the Council President Chas. H. Keyes of New York City took as the subject of his address "Tests and Standards of the Efficiency of Schools and School Systems." After pointing out the fact that in every department of commercial and industrial enterprise owners and managers are addressing themselves to the task of scientifically determining the efficiency of their materials, processes and operatives, and that in the field of social service we have entered upon the business of measuring the accomplishment of the agents and methods we employ, the speaker urged upon the Council the desirability of working out and applying certain standards or units of measurement for determining the efficiency of educational agencies. The demand on the part of the public for such an evaluation is unmistakable, and there is perhaps no greater service that the Council could perform than to take the lead in this important enterprise.

The topic which received the most attention in the discussions of the convention was doubtless that of moral education in the schools. The committee of the Council, which has had the matter under consideration for three years, presented their report of 75 printed pages, and the discussion of this report occupied several sessions. The most important recommendations of the report are the following: "Proper regard for the law and properly constituted authority should be inculcated in the child from the time he enters the public school to the end that, when he leaves it, he will continue to respect and obey the law and endeavor to have others do likewise. In order that moral instruction may not be left to chance, which frequently means neglected altogether, a tentative course is submitted as part of this report. It is recommended that such modification of this course be made as may be found necessary to meet the needs of different localities and that definite instruction be given from time to time. In order that this instruction may be vital and effective, it is recommended that committees of teachers collect and collate suitable material from history, literature, daily life and other sources, to illustrate and enforce these lessons, and that means be provided for publishing and distributing this material."

In the discussion of the report most of the speakers agreed with



its fundamental position as to the desirability of specific moral instruction, and confined themselves to a consideration of ways and means. At a subsequent session Prof. George A. Coe, of the Union Theological Seminary, speaking on "Virtue and the Virtues, a Study of Method in the Teaching of Morals," condemned the formal and abstract nature of much of our moral teaching, and urged that the material be drawn from the play and the daily life of the child. President David Starr Jordan, of Stanford University, discussing the "Moral Training of Students," pointed out some of the temptations against which the college student must be put on his guard, and Prof. Chas. E. Rugh, of the University of California, emphasized the instinctive basis of moral ideas, and the advantage of taking account of fundamental instincts in the teaching of morals. President James H. Baker, of the University of Colorado, speaking at one of the general sessions on the "Reorganization of American Education," said "if there is a criticism more just than another, it is that the schools do not give satisfactory results in terms of will. Will training is the third of the vital problems of reorganization, but, perhaps, first in importance." How this "will training" is to be brought about the speaker did not indicate. In the department of school administration Richard Welling, of New York, referred to the low ebb of civic morality indicated by the political investigations in Ohio, Indiana, Illinois and New York, and urged upon the schools a more specific training for civic righteousness. President John R. Kirk, of the Kirksville State Normal School of Missouri, addressed the normal school department on the important topic of "Preparation of Teachers for Moral Training in the Public Schools." His prescription was, "Keep your pupils busy in the open air. Give them plenty of exercise and plenty of outdoor work. Idleness is the great bugbear that is driving our boys and girls wrong. Give the boys and girls a healthy body and the mind will be clean and healthy, too."

Another prominent subject in the section discussions was that of college entrance requirements, and the relations of the high school to the college. Prof. Harvey N. Davis, of Harvard University, explained the new Harvard entrance requirements, according to which the university examines each candidate in four required subjects and in whatever others he chooses to elect, subject to certain restrictions. Prof. Otis W. Caldwell, of the University of Chicago, presented the entrance requirements recently adopted by that institution. The

number of credits required for entrance in the two institutions is practically the same, and the essential difference seems to lie in the fact that Harvard *requires* four subjects, and prefers to test the attainments of the candidate in all subjects by examination, whereas Chicago makes no specific requirement beyond a certain continuity and degree of advancement in the subjects offered for credit, and leaves the proficiency of the candidate to the certification of the high school instruction. It was plain to be seen from the discussion that the Association was overwhelmingly in favor of the certification plan. The report of the committee of nine on articulation of high schools and colleges, presented by Chairman Charles D. Kingsley, of the Brooklyn Manual Training High School, maintained that "any student who has satisfactorily completed a well planned high school course should be admitted to college." This policy, if generally adopted by colleges, would greatly increase the elasticity of high school work, would enable the high schools to do their duty by the students who do not intend to go to college, and would permit of a more adequate and practical preparation for college itself. While, as Prof. Davis pointed out, the new Harvard entrance requirements are a long step in the direction of greater liberality, it may be questioned whether a single written examination offers as good an indication of a student's ability in a subject as the careful judgment of the high school instructor who has watched that student for months. After all, the ability to do college work successfully is the essential test. It would seem good policy, therefore, for the college to throw the responsibility for entrance entirely upon the high school, and then to determine for itself by the student's work in class whether he is really fitted to pursue that work.

A third topic of discussion was child hygiene,—including physical training, conservation of vision, subnormal children and the specialization of the school course to meet the needs of different types of children. Dr. Leonard P. Ayres, of the Russell Sage Foundation, New York City, and Dr. Frank G. Bruner, of the Child Study Department, Chicago, discussed the problems of the ventilation of school rooms, the effects of fresh and vitiated air on pupils and the value of open air schools. Dr. H. H. Goddard, of Vineland, N. J., gave an account of his work with the Binet tests, and exhibited a number of charts showing the dependence of feeble-mindedness upon heredity. A joint session and a round table conference were devoted to the sub-

ject of sex hygiene, and a number of speakers referred to the subject in the discussion of other topics. All agreed that there was need for instruction in matters of sex, and while some claimed that such instruction *ought* to be given by the parents, it was generally admitted that for actual results we should have to look to the schools. As to when this instruction should begin, what should be its nature, how long it should be continued and who the teachers should be, there was great diversity of opinion. A discussion of the qualifications of the health officer indicated that, while a thorough medical training was a prerequisite, this in itself was not sufficient. In addition to his medical preparation, the health officer should know something of psychology and mental tests, and should be well read in sociology and penology. In his address of welcome at the Greek Theater, at Berkeley, President Wheeler pointed out how extremely complex the problems of education had become during the past quarter of a century owing to the tremendous increase in complexity of our population and our civilization. Superintendent S. L. Heeter, of St. Paul, in his address on "Separate Schools with Separate Courses of Study for the Separate Needs of Our Children," plead for a recognition of this complexity in the construction of the elementary course of study. Differences of individuality must be recognized, and the boy who intends to leave school at 14 should not be expected to do the same kind of work as the boy who intends to go to college.

At a meeting of the library department Principal Katharine D. Blake, of New York City, seriously questioned the advisability of so much emphasis on fairy tales and myths in the early reading of children. She contended that books could be found that were true to life and yet of fascinating interest to children. At her suggestion a committee was appointed to draw up a list of books of this character. In the business meeting of the department of child study objection was raised to that name, and it was voted to change the name to child hygiene, as better representing the work of the section. A session of the department of special education was devoted to the conservation of vision, and as a result of the conference it was voted unanimously to request the Association to appropriate \$1000 for the investigation of the subject. As indicated above, however, the board of directors reduced the appropriation to \$500.

At an early session of the Council Mr. Harlan Updegraph, specialist in school administration, U. S. Bureau of Education, led a discussion

on "Improvement of Teachers in Service in City Schools," and, in view of the wide difference of opinion on the methods of securing such improvement, advocated a thorough investigation, in which special opportunity should be afforded the teachers themselves to express their views on the subject. At the same session State Superintendent E. T. Fairchild, of Kansas, introduced a resolution calling for the appointment of a committee of eleven to investigate present conditions in rural schools and report on the present opportunities of improvement. For the use of this committee the board of directors appropriated \$1000. After some discussion the Council decided that hereafter its meetings would be held in the winter in connection with the department of superintendence. The next meeting will, therefore, be held at St. Louis in February. The following new members were elected: E. C. Moore, Yale; E. H. Elliott, Wisconsin; Ellen C. Sabin, Wisconsin; C. S. Meeks, Idaho; E. E. Scribner, Michigan; C. H. Judd, Chicago; P. P. Claxton, Washington; Edna H. Rich, California; Henry Suzzallo, New York; H. B. Wilson, Illinois; Laura B. Gill, Massachusetts; E. L. Thorndike, New York; F. E. Bolton, Iowa; Payson Smith, Maine; James A. Barr, California; A. E. Winship, Massachusetts; W. A. Brandenburg, Oklahoma; T. H. Harris, Louisiana; C. N. Kendall, Indiana.

At the meeting of the board of directors a communication was received from former U. S. Commissioner of Education Dr. Elmer E. Brown, urging the Association to co-operate in the movement for an international educational society. A suggestion was made that, owing to the increasing attendance of teachers at summer schools, it would be advisable to hold the meetings of the Association in August instead of July. No action was taken.

Superintendent Carroll G. Pearse, of Milwaukee, was elected president of the Association for the ensuing year, and it was decided to hold the next meeting at St. Paul, Minn.

J. C. B.

## ABSTRACTS AND REVIEWS.

E. MEUMANN. *Der gegenwärtige Stand der Methodik der Intelligenzprüfungen* (mit besonderer Rücksicht auf die Kinderpsychologie). Zeitschrift für Experimentelle Pädagogik, X Band, Heft I, 1910. Pp. 68-79.

In this suggestive and critical article Professor Meumann discusses the purposes and methods of mental testing. He recognizes the following four groups: (1) The psychiatric mental tests; (2) tests for the purpose of fixing the limits of the abnormal child as opposed to the normal, and the determination of typical intelligence disorders of childhood; (3) the analysis of the intelligence of the normal adult individual; (4) tests for normal children.

The psychiatrist uses tests of acquired knowledge as well as of normal mental functioning, but he must modify the standards of the former so that they take cognizance of the advantages and disadvantages of the patient's milieu. The problem of the abnormal child involves the determining of the degree of imbecility and idiocy through the application of simple tests adapted to the natural limitations of the child. In the normal adult the analysis of the intelligence serves the purpose of determining the gradual and qualitative differences of the individual's natural gifts, varying from that "dullness," which still is not abnormal, to genius. The problem is whether or not there is a correlation between the different individual elements of intelligence, whether positive individual differences postulate reciprocal differences; *e. g.*, does artistic imagination postulate a lesser development of reasoning activity? In testing normal children a new problem is added, namely, whether or not it is possible to determine a normal standard for each individual age of the child with deviations above and below that age which would still permit the child to be classified as normal.

Professor Meumann distinguishes two kinds of methods for testing school children, the psycho-analytical (psychological) tests and the practice tests. Two very important hypotheses are involved in both of these methods: (1) That all sides of consciousness take part with

each mental activity; (2) that correlations are present between the different mental functions. The intelligence should never be examined with one or a few tests, but always with series of tests, which are so arranged that one may be sure to have tested all the possible main functions of intelligence. Special tests should be given to determine the degree of intelligence in the higher sense, tests that will allow all attributes of synthetic thinking to come into play. This is best accomplished through the methods that are purposive, that involve the working with abstract elements, and that include tests for the solution of usual, easy and significant connections of new combinations of imagination.

The test methods are indispensable on account of their great practical usefulness. In all but the younger children, tests of acquired knowledge are to be excluded; hence the tests are to be limited to those that are clearly functional. The article is presented as a survey of the field and a summary of the principal points of view. It is the first of a series on the problem of mental testing.

LUTHER E. WIDEN.

University of Iowa.

W. M. McKEEVER. *Psychological Method in Teaching*. Chicago: A. Flanagan Company, 1909. Pp. xvii, 332.

This is a suggestive elementary text, adapted to the use of beginners in the study of educational theory, especially such as can give only a small amount of time to professional training or such as must get their educational theory and their introduction to psychology at the same time.

The author first discusses the meaning of education and its psychological and biological basis in instinct, then follow brief sections on self-activity, habit, the place of perception, imagination, memory and reasoning in teaching. These sections are simple and well stated. Two very practical chapters devoted to the recitation, its aims and method follow. Part II contains a series of chapters that should be helpful to the beginner on the various elementary school subjects, reading, language, mathematics, art and industry, geography and nature study, elementary agriculture, history, physiology and hygiene, closing with a chapter full of practical suggestions as to general exercises for the elementary school. Part III, devoted to moral instruction, begins quite properly with the teacher's personality as a factor

in securing proper moral growth in the pupil. Following this, the proper mental attitude for the student, the development of public sentiment in the school and the moral values of athletics are taken up. The social point of view is here, as elsewhere, fundamental.

The author is to be commended for his excellent illustrations, which serve to render the entire book quite concrete and readable.

IRVING KING.

State University of Iowa.

R. TAIT MCKENZIE, B.A., M.D. *Exercise in Education and Medicine*. Philadelphia: W. B. Saunders Company, 1909. Pp. 406. Cloth, \$3.50 net.

Dr. McKenzie, who is Professor of Physical Education at the University of Pennsylvania, has given us a volume of very attractive make-up and interesting subject-matter. His purpose is to present a comprehensive exposition of the use of exercise—in the widest sense of the term,—both as an integral part of the educative process and as a therapeutic agency in the treatment of certain abnormal or diseased conditions. The first part of the book, to the consideration of which we must limit ourselves, covers such topics as the physiology of exercise, the use of massage and passive motions, exercise by the aid of apparatus, the essential features of various gymnastic systems (German, Swedish, Japanese, etc.), the development of the modern playground, the municipal gymnasium and the province of physical education at large in public schools, colleges and universities, and in special institutions for the blind, the deaf and the feeble-minded.

One of the most interesting chapters, the eighth, deals with the relation of various forms of exercise to age, sex and occupation. Here are included extensive charts that show with regard to the chief forms of athletic sports, games and gymnasium exercises, the chief regions of the body used, the degree of demand upon nerve control, the influence on pulse and respiration, the physical traits developed, the optimal age for its use, etc.

The book abounds in charts, photographs and drawings (346 illustrations in all). The treatment is clear, systematic and entertaining, and the volume should, on all these counts, appeal strongly to students and practitioners of medicine and particularly to teachers of physical training.

G. M. W.

## NOTES AND NEWS.

### **WHY INVESTIGATIONS MUST DISAPPOINT**

Never in the short history of public, universal education has the situation been so critical as it is now in America. The dissatisfaction in New York City is only one symptom of a vast undercurrent of unrest. Baltimore has had its investigation—an investigation conducted by experts in public education, and yet for that very reason revealing all too clearly how totally inadequate is our understanding of the complicated forces that universal education has set in motion. A flash of light here and there indicates that certain strands have been untangled. We are tolerably clear on the subject of school buildings and school sanitation. The Baltimore investigating commission can clearly put its fingers on the tangible defects here. But when it comes to an evaluation of subjects of instruction and of methods of teaching in the light of their results, there is little in the report that satisfies or convinces. School discipline is brushed aside with a few trite remarks about corporal punishment, but the great, fundamental questions remain untouched, and meantime the *Catholic Educational Review* openly charges that the American public school has failed lamentably in the prime problem of moral education, namely, the development of self-control and of an effective respect for the rights and feelings of others, and backs up these charges with alleged facts of a most damaging nature which no journal of secular education has, so far as we know, been inclined to refute.

The truth is that, in establishing this far-reaching system of public schools, we have set in motion a vast machine many parts of which are not yet under control, meaning by control a thoroughgoing understanding of the forces with which we work. Our practice has leaped far ahead of our theory, and under a condition of this sort the machine is certain to break down in places. In education we are still working very largely on the basis of the blind principle of trial and error. Progress has been made under this condition; progress will continue to be made, but at the cost of some priceless materials.



**THE HOUR OF OPPORTUNITY FOR EXPERIMENTAL EDUCATION**

It is easy to criticise; it is hard to construct. It is easy to develop a faith on the part of the public in nostrums; it is hard to teach the public or any individual member of the public that ultimate progress in education, as in every other field of human activity, can come only by the long and tedious process of seeking out facts, building hypotheses, testing them in practice, rejecting strenuously the futile, cleaving relentlessly to the effective. In little isolated corners this type of work is being done, but it is not in those fields concerning which recent educational propaganda has aroused an intense public interest. It is rather in connection with the simpler phases of our problem, with which, of course, a start must be made, but in which it seems hard to arouse lay enthusiasm. We know now a little about the teaching of arithmetic; more about spelling; perhaps most about reading; next to nothing concerning language; less than nothing concerning geography, history, art, music and manual training. It is true that much has been written about these last-named subjects, and working hypotheses have been framed as to their influence upon the conduct of those who undergo instruction in them; but when we look for actual data, these data are lacking. The Baltimore commission, in speaking of all these subjects, simply compared the teaching in Baltimore with the teaching in other cities. The commission is not to be blamed for doing this; it was all that could be done. No one knows what the teaching of these subjects can be made to accomplish, and if one has hypotheses regarding their influence, the means for testing the teaching with reference to the desired outcome are not at hand.

It is easy to criticize; it is hard to construct. Constructive effort takes time, energy and money. And what education now needs is to divert a little of the public enthusiasm that has been concentrating itself upon the educational "cure-alls" into the channels of patient research and a careful, sober, responsible effort to "think through" the process of education from beginning to end. One cannot think profitably without a solid basis of fact; hence the need of research; hence the need of the scientific method of getting and testing facts. But given the facts,—and we have a few of them now,—what is needed is a clear-cut theory—such a theory as Newton formulated; such a theory as Darwin thought, not quite through, but far enough to revolutionize half a hundred human activities. Consummations such as

these cannot come in a day in education, no matter how devoutly they may be wished.

With the public mind just now in an investigating mood,—wearied, perhaps, with the spectacular and bizarre developments about which we have been so wordy,—is it not the appropriate time to launch a propaganda of another type? Is it not time to take the public into our confidence, explain to them patiently and simply how severely we are handicapped by our ignorance of the forces with which we must work, and urge in season and out the rapid extension of facilities for educational research? Is it not time to rid ourselves and others of the fatal notion that a Rome can be built in a day, and plan for an aggressive campaign extending over years of patient toil—systematic, thoroughgoing, painstakingly careful of minutest details? Have we not here the most favorable opportunity to invest in the movement which this JOURNAL represents that large capital of public interest and enthusiasm, so much of which is now being exploited in “wild-cat” educational ventures which can return upon the investment only dividends of disappointment?

W. C. B.

The Board of Estimate and Apportionment of New York city is conducting an investigation of the city public schools, and has enlisted the services of the following educational experts: Prof. Paul H. Hanus of Harvard University, Prof. E. H. Elliott of the University of Wisconsin, Prof. F. M. McMurry of Teachers College, Columbia University; Dr. Frank P. Bachman of the Cleveland Normal School, and Dr. J. D. Burks, Philadelphia, Pa.

Several years ago Professor His of Leipzig called the attention of neurologists to the gain that would accrue from co-operative work in place of the old, disjointed individualism of the earlier investigators. His suggestions fell on fertile soil, and for the past decade the “Brain Commission” of the International Association of Academies has successfully labored to co-ordinate researches upon the brain. The advantages of this arrangement have proved so manifest that the embryologists have adopted a similar plan, and met at Utrecht in June to found an International Embryological Institute. In view of the growing interest and activity in experimental pedagogy, and of the extreme complexity and technical difficulty of the investigations, it might be of advantage to the experimentalists in education to have some such central institute for co-ordinating the work.

The Director of the Department of Music of the State Teachers' College of Iowa at Cedar Falls, Prof. C. A. Fullerton, is making successful use of the victrola in the instruction of normal school students in vocal music. The instrument is used especially for demonstration of musical effects before the vocal classes, for the cultivation of an acquaintance with the classics, especially in vocal solos, and for the illustration and analysis of program music for the purpose of arousing interest and intelligent appreciation of the music to be rendered in concert and recital. It would seem that if handled with proper precaution this instrument is capable of becoming one of the most effective means of cultivating an acquaintance with good music by its use in public schools and in normal schools.

According to the daily press, a Berlin physician has recently studied 18,000 children with respect to right- and left-handedness. Over 95 per cent. were right-handed, while there were but 37 ambidexters in the entire number. The lowest grades showed the highest percentage of left-handedness, and there was a gradual reduction of the number as the grades advanced. Studies of ancestry indicated that about one case of left-handedness in three contains a hereditary element.

Botanists have demonstrated conclusively that it is possible to force the growth of vegetables by means of electrical currents distributed from a powerful dynamo. Now, according to the daily press, Swedish scientists are much interested in the outcome of experiments that have been carried on for some time in Stockholm to determine whether the electric field has a similar effect in stimulating human growth. Two groups of twenty-five children were selected, as nearly alike as possible in general health, size and weight. The respective groups received their instruction in two rooms, both equal in size, ventilation, lighting and other general conditions. But the group in one was constantly exposed to the influence of electric currents, while the other group pursued its studies under normal conditions. After a test of several years the two groups of children have been compared, and it is claimed that the electrified children have outstripped the others physically and mentally; that they have grown faster, put on weight more quickly, and have shown more physical fitness generally, besides possessing superior mentality.

On and after October 1, 1911, the use of public drinking cups in New York City will be unlawful. The city authorities have followed the example of Boston in forbidding the use of common drinking cups in public buildings, institutions, factories, theaters, schools, railway stations and other public places. This is an important advance in public hygiene, but it will give satisfaction only if flowing jets or individual paper drinking cups are provided in place of the common cup.

According to *Science*, the New York Legislature has passed a bill to appropriate \$10,000 for the establishment of a school of sanitary science and public health at Cornell University.

We have received No. 1 of the *Reed College Record*, an attractive bulletin issued by Reed College, Portland, Ore. The *Record* gives a historical sketch of the Reed bequest and the founding of the college, states the aims of the institution, and indicates in outline the standards which will be maintained.

The first number of the *Journal of Experimental Pedagogy*, which is the successor of the old *Training College Record*, and is now edited by Prof. J. A. Green of Sheffield, presents a very attractive appearance. The contents are indicated in another section. The tone of scientific inquiry which is evident in its pages augurs well for the future of English pedagogy. Our chief complaint is that it does not come often enough. The *Journal* is published twice a year, and the subscription is 2 shillings. Away off in one corner, in fine print, we discovered the statement that if public support in the way of subscriptions and contributions seemed to warrant it, the *Journal* would ultimately be issued once a term. May the support be abundant, and may it manifest itself speedily!

It is announced that Bryn Mawr College has received a bequest of \$150,000 from Phoebe Anne Thorne of New York to endow an associate professorship of education and the Phoebe Anne Thorne Model School. The latter school will be conducted by the college as an experimental high school in connection with a graduate school of education. From the same source comes a gift of \$200,000 to Swarthmore College as an addition to the endowment fund. Swarthmore had

just succeeded in raising half a million for that fund, so that it now has \$700,000, which will be used in strengthening and improving the present equipment.

Governor Dix of New York State has recently approved a bill appropriating \$140,000 for the Oswego State Normal School.

The psychological department of the University of Minnesota has been enlarged by the addition of two rooms, each fifteen feet square, which will be used for experimental and research purposes. The wall between the rooms contains a ground glass window six feet square, and lantern connections will be available for experiments with light. Carl Rahn (Ph.D., Chicago), who has been teaching at the University of Pittsburgh the past semester, and A. N. Gilbertson (M.A., Minnesota) have been appointed instructors in psychology for the coming year.

The department of psychology and education of the Central State Normal School, Mt. Pleasant, Michigan, has organized a psychological clinic for the study and examination of normal, retarded and defective children. The staff is composed of two trained psychologists, E. C. Rowe, Ph.D., and M. L. Billings, A.M., and a physician, C. M. Baskerville, M.D. The clinic will have the following aims:

1. To bring students of education into closer relation with children and in contact with the methods of determining individual variation and deficiency.
2. To give teachers and parents the results of such facts and opinions as may be arrived at in the examination of children presenting peculiar problems.
3. To extend the facilities of this school to superintendents and teachers of nearby towns and villages who desire to arrange for the examination of backward children and others requiring special attention.

At the Columbia University summer session, registration reached a total of 2972 names. Among those who delivered special lectures we note Dr. J. J. Findlay of the University of Manchester, England, who spoke on "Arnold of Rugby" and "Cultivation of the Civic Spirit," and Max Walther of the Musterschule, Frankfurt, Germany, who discussed the direct method of teaching modern languages.

Registration at the Cornell University summer session nearly reached the 1200 mark this year. The courses offered in conjunction with the College of Agriculture proved specially attractive.

Dr. Arthur Orlo Norton, assistant professor of education at Harvard University, who has been abroad during the past year, is engaged in the preparation of a history of the German universities. He spent a portion of the summer in Italy, working in the libraries of Padua and Florence.

Dr. John F. Shepard, instructor in psychology in the University of Michigan, has been advanced to an assistant professorship in that institution. An additional instructorship in psychology has been created, and will be filled by Henry Foster Adams, Ph.D. (Chicago). Harry Wollen Crane, A.B. (Michigan), at present assistant in psychology, has been elected to the George S. Morris memorial fellowship for the year 1911-12.

Dr. Knight Dunlap, associate in psychology at the Johns Hopkins University, has been appointed associate professor.

Announcement is made of the following appointments for next year in the School of Education of the University of Pittsburgh: Prof. Charles Barr Robertson, Superintendent of the Schools of Practice and Professor of Psychology and Education in the Cortland State Normal School, has been called to the chair of Secondary Education, and will have charge of the general co-operative relations between the School of Education and the public high schools, including the direction of practice teaching. Dean Henry Davidson Sheldon of the School of Education of the University of Oregon has accepted an appointment to the professorship of the History of Education. Dr. Sheldon will spend next year in Europe on leave of absence, taking up his work in Pittsburgh in the fall of 1912.

Prof. Ernst Meumann of the University of Leipzig has accepted a call to the Kolonialinstitut in Hamburg.

Dr. David Spence Hill of Peabody College for Teachers, Nashville, Tenn., has been appointed to the chair of psychology and education at

the University of Tennessee, made vacant by the resignation of Prof. P. P. Claxton.

Miss Clara Jean Weidensall, Ph.D., University of Chicago, has been chosen to conduct psychological tests and investigations at the Bedford Hills Reformatory for Women, Bedford Hills, N. Y. Dr. Weidensall will carry on the work begun a year ago last summer by Prof. Eleanor Harris Rowland of Mt. Holyoke College. The work is, we understand, supported by private funds, and aims to establish the serviceability of psychological inquiry in determining whether women brought before the court should be committed to that institution.

Dr. Stevenson Smith of Hampton-Sidney College, who has had charge of the psychological clinic at Teachers College, Columbia University, this summer, has accepted a position in the University of Washington, Seattle, Washington, to establish a psychological clinic in that institution. The position has been created in connection with Gatzert Foundation for Child Welfare, and offers wide opportunities for usefulness. Aside from the work in the University, the Foundation provides for public lectures and an experimental school for teaching. Dr. Smith will have the co-operation of a large corps of physicians.

Prof. Ira Richardson has been appointed head of the department of education at the Northwest Missouri Normal School, Maryville, Mo.

Miss Ellen Fitz Pendleton associate professor of mathematics, dean and acting president of Wellesley College, has been elected president of the institution.

William M. Davidson, superintendent of schools at Omaha, Neb., has been elected to the position of superintendent of schools at Washington, D. C.

James H. Van Sickle, superintendent of schools at Baltimore, Md., has accepted the position of superintendent of schools at Springfield, Mass.

Frank A. Manny of the education and extension departments of the Western State Normal School, Kalamazoo, Mich., has been appointed director of the training of teachers in the city of Baltimore.

Prof. P. P. Claxton, of the University of Tennessee, well known for his work in conducting the Summer School of the South, has been appointed United States Commissioner of Education, vice Dr. Elmer E. Brown, who assumes the Chancellorship of New York University.

Dr. G. L. Jackson, instructor in education at the University of Michigan, has been advanced to assistant professor of education at that institution.

Mr. A. D. Darbyshire, who was appointed to the newly-instituted lectureship in genetics at the University of Edinburgh, delivered a course of six lectures on heredity during the summer session.



## CURRENT PERIODICALS.

(In this section only such articles will be noticed as bear directly or indirectly upon the interests of this Journal.)

THE JOURNAL OF EXPERIMENTAL PEDAGOGY AND TRAINING COLLEGE RECORD. Vol. I, No. 1. March, 1911. C. SPEARMAN. *The Way to Develop Experimental Pedagogy.* 1-3. Strict scientific method and analysis must be insisted on if real progress is to be made. W. BROWN. *Modern Educational Psychology.* 6-9. The study of mental types has shown considerable progress, but little work has been done on the variability of mental functions, and still less on the concomitance of variation, commonly known as correlation. W. H. WINCH. *Social, Class and Mental Proficiency in Elementary School Children.* I. 9-18. The boys of a school were divided into two classes on the basis of home economic conditions as indicated by the amount of rent paid. The boys from the better homes were more advanced for their age, and showed greater educational attainments. The greatest inequality between the two classes was in arithmetic, spelling and composition, the least in manual training and drawing. H. BOMPAS SMITH. *The Function of Experiment in Educational Science.* 18-24. Deplores the antagonism between the old-fashioned teacher and the scientific psychologist. Interpretation and evaluation are needed as well as experimentation. KATHERINE L. JOHNSTON. *M. Binet's Method for the Measurement of Intelligence.—Some Results.* 24-31. An examination of 218 girls, ranging from 6 to 18 years of age. P. SANDIFORD. *Educational Measurements.* I. 31-38. A study of the heights and weights of 50 Manchester grammar school boys. GLADYS W. MARTIN. *The Evidence of Mental Fatigue During School Hours.* I. 39-45. The tests used were speed of perception, cutaneous space threshold, speed of multiplication and muscular capacity. W. G. SLEIGHT. *Memory Training,—Is It General or Specific?* 51-54. There was no evidence of transfer of training.

L'EDUCATEUR MODERNE. Sixth Year. January, 1911. G. COMPAYRÉ. *Secondary Education in France.* 1-3. The fight over Greek and Latin waxes hot in French secondary schools, and at present the contest turns on the pretended decadence of French style. In most schools the number of pupils electing the classics has fallen off

markedly. Prominent Frenchmen have raised the cry that the younger generation cannot write French, and demand a return to the old compulsory study of the classics. ROGER CONSINET. *History Instruction in the Primary School*. 4-16. Children do not know the history of their own country. They are taught certain phrases, which they repeat parrot-fashion, but have no comprehension of the trend of historical events. The reasons for this are that they do not like the history instruction, and that they are not able to profit by it. In order to avoid the learning of mere words, one should begin history with the present and work back into the past. VICTOR PANCHET. *The Treatment of Idleness*. 17-29. A physician discusses the dangers of mental slothfulness in the home and in the boarding school, and makes pertinent suggestions for the encouragement of mental alertness. J. J. VAN BIERVLIET. *Experimental Psychology*. 30-35. The eminent psychologist discusses the conditions which reinforce memory, and psychological methods for the measurement of intelligence, notably pitch discrimination and visual acuity.—February, 1911. G. COMPAYRÉ. *Secondary Education in Argentina*. 49-52. A discussion of a portion of the recently published "General Census of Education" in the Argentine Republic. The South Americans are in advance both of the French and of the North Americans in adapting their secondary courses to the needs of specific localities. This is what some of our advanced educators are endeavoring to secure in connection with the movement for vocational education. A. GONNET. *On the Choice of a Career*. 53-68, 122-128, continued. An extended analysis of the motives which may determine the choice of a career. A. MARCERON. *The Report of M. Steeg on the Budget of 1911*. 69-78. A useful digest of the 447 pages of this official document, which is a detailed and authoritative presentation of the actual educational conditions in France. M. DE LA CHAPPELLE. *Education of Deaf Mutes at Rotterdam and at Asnières*. 79-84. Lip-reading and vocal utterance are the foundations of a course which has definite vocational training as its aim.—March, 1911. G. COMPAYRÉ. *The Discussion of the Budget in the Chamber of Deputies*. 97-100. The discussion occupied more than ten sittings, and included speeches from over fifty deputies. As a large number of the deputies were formerly teachers, "the parliament often resembled a pedagogical congress." The chief topics of discussion were religious neutrality, agricultural and industrial education, and administration and inspection. G. DEMENY. *On the Importance of Physical Education for Women*. 101-108. The ideal of the "athletic girl" is gradually pushing its way into the French home. MÈLE. VARLET. *Social and Civic Education in School*. 109-112. An outline of important points in civic education. O. FRAPPIER. *The Collective Influence of Children upon Each of Them as Individuals*. 113-121. A study of children's preferences in play leads to interesting reflections upon the development of the spirit of social solidarity.

## PUBLICATIONS RECEIVED TO AUGUST 1, 1911.

(Notice in this section does not preclude a more extended review.)

LEONARD P. AYRES, PH.D. *Seven Great Foundations*. New York; Russell Sage Foundation, 1911. Pp. 79.

A collection of articles reprinted from the *Journal of Education*, describing the Peabody Education Fund, The John F. Slater Fund for the Education of Freedmen, The Carnegie Institution of Washington, The General Education Board, The Carnegie Foundation for the Advancement of Teaching, The Russell Sage Foundation and The Anna T. Jeanes Foundation.

A. BINET, Editor. *L'Année psychologique*. 17th year. Paris: Masson et Cie., 1911. Pp. xi, 498. 15fr.

This volume of the important French year-book of psychology follows the general plan of its predecessors—a summary of the progress of psychology during the year just past, a series of original contributions and an extensive review of the recent literature. Among the contributions of interest to educational readers should be cited "The psychophysiological evolution of the child from birth to the second year" by Cruchet, "The school and society" by Paul Lapie, and the "New researches on the measure of the intellectual status of school children" by Binet. These articles will be summarized later.

OTTO BOBERTAG. *Ueber Intelligenzprüfungen (nach der Methode von Binet und Simon)*. Leipzig, 1911. Reprint from *Zeits. für angewandte Psychologie*, 5: 1911, 105-203.

An instructive critical review of the Binet-Simon tests, based upon trial with several hundred children of various ages. Will be reviewed later.

FREDERICK S. BREED. *The Development of Certain Instincts and Habits in Chicks*. New York: Henry Holt & Co., 1911. Behavior Monographs, Vol. I, No. 1. Pp. 78. \$1.00.

An important experimental contribution to the vexed subject of the nature of instincts and their modifiability. This is the first of the series of Behavior Monographs issued by the founders of the *Journal of Animal Behavior*.

ALPHONSE DE CANDOLLE. *Zur Geschichte der Wissenschaften und der Gelehrten seit zwei Jahrhunderten*. Deutsch herausgegeben von Wilhelm Ostwald. Leipzig: Akademische Verlagsgesellschaft, 1911. Pp. xx, 466.

This constitutes the second volume of the studies of "Great Men" issued under the supervision of Professor Ostwald. Volume I was re-

viewed in the April number of this JOURNAL. The editor speaks of the present book as "the foundation work of a new science."

GEORGE V. N. DEARBORN. *Attention: Certain of its Aspects and a Few of its Relations to Physical Education*. Reprinted from American Physical Education Review, XV, Nos. 8 and 9, 1910, and XVI, Nos. 1, 2 and 3, 1911. Pp. 72

Emphasis is laid on the motor aspects of attention and the rôle of clearness in consciousness for the adjustment of the organism to its surroundings.

FLETCHER B. DRESSLAR. *American Schoolhouses*. Bulletin 444, U. S. Bureau of Education. Washington: Government Printing Office, 1911. Pp. 133.

Probably the most serviceable account of modern school architecture under American conditions in existence. In addition to the text the book contains 267 plates presenting photographs and ground plans of representative American school buildings.

W. R. DUNHAM. *Science of Human Life*. Boston: Richard G. Badger, The Gorham Press, 1910. Pp. 189.

A very curious, freakish discussion on the nature of disease and cure.

SIGMUND FREUD. *Three Contributions to the Sexual Theory*. New York: Nervous and Mental Disease Publishing Co., 1910. Pp. 91. \$2.00.

This work will be discussed later.

G. STANLEY HALL. *Educational Problems*. Two volumes. New York: D. Appleton & Co., 1911. Pp. xv, 710, and vi, 714. \$7.50 net.

This encyclopedic work from the pen of President Hall represents the gradual crystalization of his thought on a wide range of educational topics. The volumes are an outgrowth of the lectures and discussions of the past 25 years, but the material has been completely worked over and brought down to date, so that we have here the author's mature reflection on most of the educational problems of the day.

S. HERBERT. *First Principles of Heredity*. London, 1910: A. & C. Black. Pp. viii, 199. \$1.75 net.

A clearly written book giving in brief space an excellent summary of the principles and current theories of heredity. As a handbook

for the non-technical student it is perhaps the best in the field. The treatment of many of the topics follows closely the order of Thomson's more comprehensive *Heredity*. The chapters on the inheritance of modifications, Mendelism, biometrics, and heredity and environment will be particularly valuable to those interested in the biological aspects of educational theory. The author supports Weismannism and is a strong advocate of the eugenic movement.

DAVID STARR JORDAN, Editor. *Leading American Men of Science*. New York: Henry Holt & Co., 1910. Pp. vii, 471. \$1.75.

Science is abstract and impersonal. But the development of science is due to the efforts of men whose struggles and triumphs are every whit as human and interesting as those of warriors and statesmen. This book should be widely used as a supplementary reading book in science courses, to give students an insight into the genuine scientific spirit.

J. W. JUDD. *The Coming of Evolution*. Cambridge: University Press. New York: G. P. Putnam's Sons. 1910. Pp. iv, 171. (The Cambridge Manuals of Science and Literature.)

An intimate, personal account of the work of the early evolutionists written by one who enjoyed the friendship of such men as Huxley, Hooker, Scrope, Lyell and Darwin.

SYDNEY W. MACILWAINE. *Medical Revolution*. London: P. S. King & Son, 1911. Pp. 162. 2s. 6d.

A severe arraignment of medical conditions in England, which applies with less force to the profession in America. The author pleads for a more open-minded, scientific study of causation in disease. True diagnosis means tracing symptoms to causes, and the specialist is too often content with merely applying a technical name to the symptoms. The real hope of medicine lies in the general practitioner.

A. H. MCKINNEY, PH.D. *Practical Pedagogy in the Sunday-school*. New York: Fleming H. Revell Company, 1911. Pp. 128. 50 cents net.

A fairly successful attempt to bring out some of the important points in effective teaching, and to show by illustrations how the usefulness of the Sunday school teacher may be increased.

P. MAGNUS. *Educational Aims and Efforts*. New York: Longmans, Green & Co., 1910. \$2.25 net.

This book will receive further notice.

ADDISON WEBSTER MOORE. *Pragmatism and Its Critics*. The University of Chicago Press, Chicago, 1910. Pp. 278. Price \$1.36.

A very clear and forceful presentation of the doctrine of pragmatism.

C. S. MYERS. *An Introduction to Experimental Psychology*. New York: G. P. Putnam's Sons, 1911. 40 cents net.

This is one of the Cambridge Manuals of Science and Literature. The author's excellent Text-Book of Experimental Psychology was such as to arouse expectations which are scarcely realized in the present hasty sketch.

*New Eclectic English Classics*. New York: The American Book Co., 1911. Price 20 cents each. EDWIN L. MILLER. *Carlyle's Essay on Burns*. Pp. 128. ELLEN E. GARRIGUES. *Coleridge's Rime of the Ancient Mariner*. Pp. 43. MAX MCKITRICK. *George Eliot's Silas Marner*. Pp. 220. A. F. HANSEN. *Goldsmith's Vicar of Wakefield*. Pp. 224. GILBERT S. BLAKELY. *Shakespeare's Merchant of Venice*. Pp. 112. W. D. LEWIS. *Washington's Farewell Address and Webster's First Bunker Hill Oration*. Pp. 50.

FRIEDRICH NÜCHTER, PH.D. *Organisierung der Schulleitung auf Grundlage der Selbstverwaltung*. Ansbach: Fr. Seybold, 1910. Pp. 139.

This little book plunges us into the vortex of the school reform movement in Germany. Taking the school administration of the city of Nuremberg as his special case, the author proceeds to a discussion of conditions prevalent throughout southern Germany. Students of contemporary German education will find much of interest in this monograph.

WILHELM OSTWALD. *Die Forderung des Tages*. Zweite, verbesserte Auflage. Leipzig: Akademische Verlagsgesellschaft, 1911. Pp. vi, 604. M.9.30. Geb. M.10.20.

In these pages the brilliant German scientist, philosopher and man of genius has recorded his thoughts on a wide variety of subjects from physical chemistry to Esperanto. His discussions of educational matters are of especial interest in view of his radical opposition to the present German school system, and his enthusiastic advocacy of a pedagogy which will secure the fullest development of the supernormal child.

W. B. PILLSBURY. *The Essentials of Psychology*. New York: The Macmillan Company, 1911. Pp. ix, 362. \$1.25 net.

That psychology is an active and growing subject in this country is attested by the number and variety of psychological text-books that have recently been put upon the market. The present work is a simple, straightforward presentation of the accepted data of psychology, evidently intended for introductory college classes. Approximately 100 pages are devoted to the physical aspects of mental life, as the nervous system, behavior and sensation. There are concluding chapters on work, fatigue, sleep and disturbances of the self.

*Report of the Commission Appointed to Study the System of Education in the Public Schools of Baltimore*. U. S. Bureau of Education, Bulletin 450. Washington: Government Printing Office, 1911. Pp. 112.

The present report marks an important step in the development of the Bureau of Education as an organ of service to the people. Apart from the local conditions in Baltimore the report is of value to every school administrator in the country, and the precedent of a local community calling upon the federal bureau to assist in determining the efficiency of its school system makes for a broader view of education and a civic enlightenment that augurs the ultimate enfranchisement of education from the control of party politics.

WALTER DILL SCOTT, PH.D. *Influencing Men in Business: the Psychology of Argument and Suggestion*. New York: The Ronald Press Co., 1911. Pp. 168. \$1.00.

Argument and suggestion are the two fundamental ways of influencing men, according to Scott. His book contains a very simple and direct analysis of these two phases of mental activity, discusses when to use the one, when the other, and how to make each effective. Sixteen cuts of advertisements illustrate the text. The volume is intended for the business man, but is not without attraction to the general reader, while the psychologist naturally finds of interest any evidence of the extension of his field to the solution of practical problems.

ISABELLE THOMPSON SMART, M.D. *The Problem of Mental Deficiency in the Public Schools of the City of New York*. Reprinted from Proceedings of the Third International Congress of School Hygiene, Paris, August 2-7, 1910. Pp. 7.

A brief statement of the history and present organization of the special ungraded classes in the New York City schools.

JOHN SWETT. *Public Education in California: Its Origin and Development. With Personal Reminiscences of Half a Century.* New York: American Book Co., 1911. Pp. 320.

Owing to the author's very intimate personal connection with California schools since their very foundation almost, the present volume will be of particular value as a source book for the history of education on the Pacific slope.

J. WELTON. *The Psychology of Education.* London: Macmillan & Co., 1911. Pp. xxii, 507.

This book will be reviewed in a future number of the JOURNAL.

WILLIAM A. WHITE. *Mental Mechanisms.* New York: The Journal of Nervous and Mental Disease Publishing Co., 1911. Pp. x, 151.

A sketch of the fundamental facts of consciousness from the point of view of the psychiatrist.

ARTHUR WILLEY. *Convergence in Evolution.* New York: E. P. Dutton & Co., 1911. Pp. 171. \$2.50.

A very interesting statement of problems of evolution from the point of view of artistic, creative, constructive thought, a sort of philosophy of evolution.

ROBERT M. YERKES. *Introduction to Psychology.* Henry Holt & Co., 1911. Pp. xii, 427.

This is a distinct departure from the traditional text-book in psychology. The author insists that this is not a handbook, giving the facts of the science, but it is just what its title says, an introduction, designed to make the student acquainted with certain fundamental points of view, which will serve for his orientation in later and more extended study. One of these points of view is insistence on the description and explanation of the phenomena of mind as mind without resort to the working of the physical organism as explanation. As an outgrowth of this the author develops the concept of psychic causality, and since cause involves sequence we find emphasis laid on the genetic description of consciousness.

PHILIP ZENNER. *Education in Sexual Physiology and Hygiene: A Physician's Message.* Cincinnati: The Robert Clarke Company, 1910. Pp. viii, 126. \$1.00 net.

Reports a series of talks on sex to pupils of the Cincinnati public schools and to college boys.



Peter Sandiford

## OXYGEN SUPPLY AS A CONDITION OF EFFICIENT BRAIN ACTIVITY.

WILLIAM H. BURNHAM,  
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Modern studies have shown that nerve cells function intermittently. When you voluntarily raise your arm the process is functioned by the ganglion cells of the brain, but the nervous discharge is not continuous. In the time between the impulses the cells refuse to respond to stimulation. This relative inability to react we may call with Verworn (13) the refractory stage. Thus, in all its functional activity response is followed by refusal to respond, and this refractory stage, in turn, by a stage of irritability. The stage of irritability, of response to stimulation, is looked upon as a stage of katabolism, of breaking down, of expenditure of energy, of dissimulation, and the refractory stage as one of anabolism, of building up, of assimilation. The number of responses per second, within certain limits, depends on the supply of oxygen. The smaller the supply of oxygen, the fewer the number of responses, and without oxygen functional activity ceases altogether.

Recent study of the nerve fibre is also very instructive. It was long supposed by modern investigators that the nerve fibre was incapable of fatigue; that it could function indefinitely, as a telegraph wire or the like. But the condition of this continuous functional ability is not its mechanical character and its freedom from chemical change, but the abundant supply of oxygen that it receives from the blood and the lymph. The nerve fibre is perhaps even more greedy for oxygen than the nerve cell, and in the old experiments that were supposed to demonstrate this immunity to fatigue it sucked up oxygen from the air of the room where the experiment was conducted. If, however, the experiments are per-

formed in a chamber where the oxygen has been exhausted, the response of the nerve fibre becomes intermittent, and after a time ceases altogether.

A long series of investigations in Verworn's laboratory have had to do with the relation of oxygen to fatigue. It is not necessary to discuss here the conflicting theories of fatigue proposed by this physiologist and by Sherrington and others; but the main results of the investigations by him and his pupils in regard to oxygen as an essential condition of nerve function seem to be well established. In the earlier studies Verworn (13) and his pupils showed that exhaustion of the ganglion cells is primarily conditioned by lack of oxygen. This raised the query whether the same might not be true for the nerve fibre. Ranke and Ewald anticipated this, and Von Baeyer (2) in 1903 published the report of an investigation in which he succeeded in surrounding the nerve fibre with pure nitrogen in a chamber prepared for that purpose, and under these conditions, the nitrogen merely serving to exclude oxygen, he found that the nerve fibre soon lost its irritability, but recovered again when placed in oxygen. The conductivity of the nerve also ceased when it was surrounded with nitrogen, and recovered again when placed in oxygen.

Oxygen is necessary, as shown by Fillie (5) even when the nerve fibre is immersed in a normal salt solution. The only difference is that fatigue comes less quickly in this case, because to some extent the toxic products of metabolism are washed out by the salt solution. Immersed in either a gas or a liquid free from oxygen, the nerve soon loses its irritability and its conductivity, but it recovers fully when oxygen is supplied again.

A long series of investigations in Verworn's laboratory have shown the need of oxygen for the functioning of the nervous system of vertebrates. More recently the studies by Baglioni (3) and Fröhlich (6) of the nervous system of invertebrates have given interesting results.

Fröhlich (6) finds a relation between the need of oxygen in individual nerves and the velocity of nerve conduction under similar conditions. In the nerve of a frog, with a rate of conduction of 25 metres in a second, the suffocation period

is one hour; for the nerve of a cephalopod, with a rate of conduction of one metre in a second, the suffocation period is four hours; for a nerve of the *Aplysia limacina*, where the rate of production is only  $\frac{4}{10}$  of a metre, the suffocation period is eight hours, and in this mollusk the nerves need far less oxygen than the central ganglia. Thus, the slower the process of oxidation, the less the need of oxygen, and the reason that the *Aplysia limacina* needs so little oxygen is because the processes of oxidation are so slow. It is fair to assume that in warm-blooded animals, where the rate is 32 metres per second, the need of oxygen will be proportionally greater.

In case of children, relatively more oxygen is necessary than in case of adults. How much more is needed is roughly shown by the relatively greater amount of  $\text{CO}_2$  produced by children. For each kilogram of body weight in the adult perhaps a third less  $\text{CO}_2$  is produced than in case of the boy 10 or 12 years of age.

It is not necessary to add that oxygen is no less essential when supplied to the nerve by the indirect method of respiration and the circulation and the oxygenation of the blood in our bodies than it is when supplied directly to the nerve in our laboratory experiments. Apparently, within certain limits, the greater the supply of oxygen, the more work can be done, and oxygen postpones fatigue and causes rapid recovery from fatigue.

After each nervous discharge the equilibrium of the nervous elements is automatically restored. But there seems to be an alternation of longer and more general periods of anabolism and katabolism. During waking hours the power of nerve response seems to be reduced, and the toxic products of functional activity exert an inhibitory influence. Thus equilibrium must be restored by a prolonged period for rest and building up. The best illustration of this, perhaps, is the alternation of our waking and sleeping life. We sleep when the power of response, the general irritability, is lessened. We wake when the equilibrium is restored and the irritability becomes maximum. We have reason to suppose that a large supply of oxygen aids assimilation during these longer periods as well as for the shorter ones.

Again, in normal physical exercise the inhaling of oxygen retards fatigue. Dr. Anderson has experimented with athletes, giving oxygen before and after running and after exercise. From the results he concludes: " 'Oxygen reduces the pulse rate if taken before the run or if taken both before and after exertion. The gas greatly relieved the dyspnoea which was evident after each run. If oxygen is not taken, the heart rate is quickened, and does not return to normal beat so quickly.' "

Another class of exercises approaching this subject from a different side are significant. They have had to do with the effect of school work on the physical processes. Many investigations indicate that the breathing and oxygenation of the blood are interfered with during school work. MacDonald (10) showed that the breathing of children during brain activity becomes shallow, and he concluded that the lessened oxygenation of the blood stands in direct relation to the difficulty of the mental work. Perhaps the most interesting experiments are those of Graziani (7), who tested the influence of school work in a long examination period on the blood. Graziani's subjects were university students and children of the fourth and fifth elementary classes. The observation of the blood was made first in case of all subjects at least a month and a half before the examinations began; that is, at the time when preparation for them had not yet begun, when, therefore, at least a normal amount of mental work was being done and the strain has not yet reached that degree which immediately preceded the examinations. The tests for comparison were usually made some days before the examinations. Times when the subject was in a period of nervous excitation were carefully avoided. Both tests were made always in the forenoon at nearly the same hour, so that always similar conditions as regards rest and the taking of food might be obtained.

Graziani's results were as follows:

At the first test he had 18 university students and 17 children of the fourth and fifth classes, but of these at the second tests only 10 students and 12 children were available. It is

noteworthy that all subjects had suffered great loss of weight, which varied between 2 and 10 kilograms, and an average of 3.9 kilograms per hundred of body weight. As regards the number of blood corpuscles, the results do not agree. In some cases the number is decreased; in others it is increased, and it is impossible to draw any conclusions in regard to the significance of these variations. On the other hand, the lessening of the amount of hemoglobin is noteworthy. In all subjects this was observed, with an average decrease of about 10 per cent. And the resistance of the red corpuscles was increased, a fact which points in the same direction.

In tests made by Graziani of children of four and five years of age in the elementary classes it was found that the only noteworthy and constant difference between the first and the second tests concerned the content of hemoglobin. The diminution of this amounted on the average to 7.4 per cent. The body weight was sometimes slightly decreased; sometimes it showed a slight increase. Considering the fact that all the subjects were in the period of development, it is clear that an increase in the case of all subjects was to be expected.

Especially interesting were the results which Graziani found in experiments on himself and on a small servant in the hygienic institute, an intelligent 12-year-old boy. In order to be sure that the changes that occurred were actually conditioned by extreme brain work and not dependent on other causes, such as change of habit, difference in the time of the year, etc., it seemed desirable to determine whether intensive mental work for a period of some hours exercised an influence on the number of blood corpuscles, etc. For several hours Graziani busied himself with a kind of work that was new and fatiguing to him, consisting of a long series of arithmetical computations. He worked at this so long that he actually felt himself incapable of continuing the work. Likewise, he had the boy do the same work, and permitted an interruption of it only when he had repeatedly declared that he was tired, and when he seemed to be no longer in a condition to continue the work.

The test of the blood was made the first time immediately before the beginning of the work, and the second test imme-

diately after the finishing of the work. The detailed results are given in the following table (7, p. 352):

Before the Work.			After the Work.	
No. of Red Blood Corpuscles.	Hemoglobin.	Hours of Work.	No. of Red Blood Corpuscles.	Hemoglobin.
5,050,000	80	4	4,800,000	72
5,200,000	80	4½	5,000,000	75
4,920,000	75	5	4,950,000	70
4,720,000	80	6	4,600,000	72
4,800,000	78	6	4,850,000	75
5,020,000	80	5	5,100,000	73
4,900,000	75	5	4,800,000	70
4,900,000	78	4½	4,950,000	72

The variations in the number of the red corpuscles was not significant, but the decrease of the amount of hemoglobin was noteworthy. In the case of Graziani himself the average decrease was 7.5 per cent., and for the boy about 8 per cent.

Interesting evidence of the advantage of an abundant supply of oxygen for brain work is furnished also by the modern out-door schools for anemic and tuberculous children. The improvement in their health has been marked; their height and weight have increased, and a large percentage have been cured. In the fresh-air school at Providence (1), held in an ordinary schoolroom with one wall taken out, tests of the hemoglobin were made. The result showed an increase from 74 per cent. on entering the school to almost 84 per cent. after five months, and after dropping back in vacation another increase from about 74 per cent. in September to 84 per cent. in June. With the better blood, richer in oxygen, is correlated better ability to do school work.

In spite of the illness of these children, in spite of the difficulties in pursuing certain scholastic occupations out of doors, and sometimes in spite of a shorter school period, the report has been that they have done as well or better in their studies than their indoor companions. Double doses of air, double doses of food, half doses of work has been the watchword of the advocates of outdoor schools. But apparently the half dose of work with the double supply of oxygen often has a greater effect than the full amount of work of the ordinary school.

When we add to these results the significant observations

that have been made in regard to the deterioration in mental work likely to appear when the supply of oxygen is interfered with by any cause, such as an adenoid growth, or artificial occlusion of the nostrils, as in Kafemann's experiments (9), and the great improvement that usually results from the removal of the adenoid or other hindrance to breathing, we see again the need of oxygen.

While the brain can continue to function when the supply of oxygen in the atmosphere is greatly reduced, and, according to the investigations by Speck, does not actually strike work until the oxygen is less than 8 per cent., nevertheless continued work in an atmosphere where the oxygen is considerably reduced is likely to be distinctly injurious; and even where the reduction of oxygen is no greater than in badly-ventilated rooms, it may have an influence in reducing the efficiency of the workers. While the oxygen supply is only one factor among many, it seems to be an important one. While no one of these many investigations is altogether convincing, the result of all of them taken together is very significant, and emphasizes the fact that an adequate supply of oxygen is an essential condition of efficient brain activity.

I have presented what seem to be well-established facts. To give a brief résumé, the chief points are as follows:

First: An essential condition for the functioning of the nerve cell is an adequate supply of oxygen.

Second: An essential condition for functioning of the nerve fibre is oxygen.

Third: Both the nerve cell and the nerve fibre are subject to fatigue. They recover more rapidly when supplied with oxygen.

Fourth: The amount of oxygen needed seems to depend on the number of responses of the nerve cell per second, and upon the rate of conductivity in the nerve fibre, *i. e.*, the more efficient the functioning, the more oxygen is required.

Fifth: An adequate supply of oxygen is an essential condition for the functioning of the human brain. The brain strikes work, as shown by the experiments of Speck, when the amount of oxygen in the air is less than 8 per cent., and the efficiency of the brain function is decreased when the amount of oxygen

is decreased by an adenoid growth, or the like, or by artificial occlusion of the nostrils.

Sixth: In extreme fatigue, the amount of hemoglobin in the blood is reduced.

Seventh: In outdoor schools the efficiency of the pupils in brain work is increased, and also the amount of hemoglobin in the blood is apparently increased.

The law requires pupils to attend schools where the amount of oxygen is decreased, and also the air is stagnant, overheated, too dry, impregnated with bad odors and often laden with dust and bacteria. They are expected to do brain work, an essential condition of which is an adequate supply of oxygen. From the point of view of school hygiene, the question is raised why normal children should not be permitted the supply of oxygen that is an essential condition of the work required of them as well as children who are ill.

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# A REPORT ON THE TEACHING AND PRACTICE OF HYGIENE IN THE PUBLIC NORMAL SCHOOLS OF THE UNITED STATES.<sup>1</sup>

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As the public normal schools are in a measure responsible for the health of prospective teachers, and as they are radiating centers from which influences for the benefit of children's health must largely proceed, it is highly important that they should meet the problem of hygiene instruction and practice. This report will show that although a few of our public normal schools have grasped the spirit of the modern developments in hygiene, the majority have done little more than pass through the initial stages, and that in all cases much remains to be done.

The data here presented are based upon the returns from the following questionnaire which was sent to 191 of the 203 most important normal schools listed in Volume I of the Report of the Commissioner of Education for 1909. Full returns were received from only 84 of the 191 schools to which inquiries were addressed, but a careful examination of these shows that those replying represent without doubt the best class of normal schools in the United States. Their distribution is as follows:

New England States.....	13
Middle Atlantic States.....	21
Southern States (eastern section).....	4
Southern States (western section).....	3
Central States (eastern section).....	16
Central States (western section).....	17
Southwestern States.....	7
Northwestern States.....	3
Total .....	84

<sup>1</sup>This study was made at the suggestion of Professor Lewis M. Terman, Stanford University.

## QUESTIONNAIRE.

## I. Is entrance to the normal school based on:

1. Grammar school graduation.....
2. One year of high school.....
3. Two years of high school.....
4. Three years of high school.....
5. Four years of high school.....

## II. Are courses given in the following (indicate amount of work and if required):

	Amt. of Work.	Required.
1. Physics .....	.....	.....
2. Chemistry .....	.....	.....
3. Botany .....	.....	.....
4. Zoology .....	.....	.....
5. Physiology .....	.....	.....
6. Nature Study.....	.....	.....

## III. How many courses are offered in hygiene?

1. What phase of hygiene does each course treat, *i. e.*, personal hygiene, school hygiene, mental hygiene, etc.
2. How many hours of recitation in the whole of each course?
3. When were the courses introduced?
4. Are they laboratory or lecture courses?
5. Are the courses required?
6. If not required, what reasons are offered for not requiring them?
7. If not required, about what percentage of all the students in the normal school take each course?
8. Degrees held by hygiene instructor and name of school.
9. Special preparation of instructor.
10. Text used..... Name of text.
11. Do you train special teachers in hygiene, *i. e.*, teachers to supervise hygiene in schools?
12. Is hygiene taught in the practice school?

IV. What efforts are being made to further practical hygiene, *i. e.*, to improve the *surroundings* and the *work* of the normal school for the benefit of the students' health?V. What conditions in the *surroundings* and work of the normal school are injurious to the health of the student?

## VI. Are the normal and practice schools under the supervision of a medical inspector?

1. If so, is he a licensed physician?
2. Specify what his work consists of.
3. Do students have opportunity to observe the work of a medical inspector, either in the practice school or in the city schools?
4. Are students trained to assist in medical inspection, *i. e.*, to give sight, hearing and other tests and to know the symptoms of contagious diseases, etc.?

5. Is any effort made to train students in correct habits of study and in proper apportionment of time to work and recreation?
- VII. Has the normal school a gymnasium in charge of a physical director?
  1. Are students required to take gymnasium work?
  2. If not required, about what percentage take it?
  3. What percentage of students take part in athletics?
  4. Do a majority of students get sufficient appropriate recreation?
- VIII. Is a course offered in domestic science?
  1. Give the number of hours recitation in the whole course.
  2. Is the course required?
  3. If not required, about what percentage of the students take it?
  4. Does the course aim to *emphasize* and *exemplify* the hygienic aspect?
- IX. Is there a course given in sex hygiene?
  1. If not, is the subject treated in connection with any other course?
  2. Is the study of organisms in nature study and the biological sciences used as an avenue of approach to the treatment of sex hygiene?

#### SCIENCE TEACHING AS A BASIS FOR HYGIENE INSTRUCTION.

Inasmuch as the satisfactory teaching of hygiene presupposes on the part of students some knowledge of the sciences, an effort was made to learn what science courses are offered, the amount of work given in each, and to what extent such courses are required. The returns show that, on the whole, normal schools offer, and also require, sufficient science work to serve as a foundation for a good understanding of the principles involved in the various forms of hygiene, with the exception of city normals, whose students, however, come from local high schools which give a reasonable amount of science work. Of the 11 city normals heard from, one gives no science work at all, but all the others give nature study courses ranging in length from one-ninth of a year to one year. Physiology follows nature study in importance, five of the city normals offering brief courses in this subject. The other sciences are scarcely represented. Nearly all of the 31 state normals basing entrance on high-school graduation require courses in

from one to three sciences each, covering from one-third to two-thirds of a year's work.

One might expect to find that of the city and state normals, requiring four years of high-school work for entrance, those that give little or no science work would give more attention to hygiene than the schools devoting considerable time to the sciences; but the best hygiene work does not appear to be done in these schools. Only six of the eleven city normals give hygiene courses separate from physiology, and only one of these offers more than one hygiene course. Only two of the hygiene instructors in these schools hold university degrees. Three such schools have medical inspection, three have gymnasiums in charge of directors, only one has opportunity to teach hygiene by means of domestic science, and not one offers any work in sex hygiene. Of the remaining five city normal schools two give no physiology or hygiene whatever.

The State normals, based on a four-year high-school course and giving little or no science work, do no better with hygiene. Of eight such schools, three give one course each separate from physiology. Only one of these has an instructor who holds a degree, one school has medical inspection, two have gymnasiums, and none attempt to teach sex hygiene. Three of the remaining five schools do not even have a course in physiology, only one instructor holds a degree, one school has medical inspection, three have gymnasiums, and three offer domestic-science courses.

The following table shows the number of state and city normal schools reporting which offer courses in the various sciences, also the number requiring such courses:

	Physics.	Chemistry.	Botany.	Zoology.	Physiology.	Nature Study.	Other Sciences.
Offer . . .	62	57	56	52	68	60	10
Require..	40	31	44	28	53	35	0

#### INSTRUCTION IN HYGIENE.

On the question of direct instruction in hygiene the normal schools readily fall into two groups—those treating the subject only in connection with physiology and those offering hygiene courses aside from physiology. The replies to this

questionnaire were not always explicit; but, by basing judgment in part on the whole returns from any one school, errors in making this classification have been minimized. Several schools, although stating that they give hygiene courses, quite evidently give none separate from physiology, and are classified as such. *Exactly one-half of the 84 schools heard from offer no hygiene courses aside from the hygiene given with physiology or incidentally in courses on school management, methods of classes, psychology, etc.*

Of the latter group, nine give no physiology at all. Three of these fail also to give hygiene in any form or quantity, two require physiology for entrance, one does nothing more than emphasize the teaching of hygiene in teachers' meetings, one gives two or three lectures during the year on personal and school hygiene, another requires students to take courses in psychology and school management, where personal and school hygiene, respectively, are studied incidentally and also gives some hygiene with the theory of physical training. Still another requires 10 hours of work in personal and school hygiene in a course on special methods. Of the remaining 33 schools offering no separate hygiene courses, all give brief physiology courses which are required in all cases except two. As a rule, only personal hygiene is treated, although a few include school hygiene, and scattered attempts are made in mental, community, household and sex hygiene. In addition to the work in connection with physiology, five treat school hygiene incidentally in school management, one gives hygiene with household economy and school economy, one gives lectures to girls on personal and home hygienics, and three give hygiene with pedagogy. It is evident that such a treatment must be extremely inadequate. It is impossible, however, to judge fairly the value of physiology work in these schools by the mere length of the courses. Quality of work should have equal consideration with quantity, and this depends very much upon the preparation of the instructor.

Seventeen schools did not answer the question relating to the degree held by the instructor of physiology, and these we can safely assume hold no degrees. Three others hold no degrees, but have had special training, and 22 hold college or

university degrees, most frequently the M.A. Over half of the instructors holding degrees have either specialized in subjects related to hygiene or have had additional special preparation, such as graduate study, directing gymnasiums, hospital experience, etc. A number have had excellent experience and training, and are undoubtedly capable of doing much more work in hygiene than is possible in connection with a brief physiology course.

In the remaining 42 schools hygiene courses separate from physiology are given. It cannot be said that the schools in this group merely shift their energies from physiology to separate hygiene courses, for they offer more work in physiology than the former groups. The superior work of this group is also apparent in the fact that a large majority of the instructors hold college or university degrees.

In a few schools it may be said that hygiene pervades the whole curriculum. For example, one school offers several courses in hygiene, and in addition deals in various other courses with the hygienic aspects of school problems. Sanitation is given with school administration, and hygiene is considered in observation in the practice schools in educational psychology and in child psychology. Such correlation of hygiene with other courses unifies the student's knowledge and instills the habit of considering all school problems, whether they be questions of discipline, the making of daily programs or the classification and grading of pupils, from the point of view of hygiene. However, to carry out successfully such a program, every instructor must be awake to the problems involved. The development of hygiene is plainly in the direction of giving, besides the work with physiology, separate courses in personal hygiene, school hygiene, school and home sanitation, prophylaxis, clinical psychology, sex hygiene and other courses. Apparently 13 of the schools reporting are offering courses in personal hygiene, most of which have been adopted since 1907. The latter courses vary in length from 10 to 180 hours, the central tendency being 40 to 50 hours. Nine schools report that the course in personal hygiene is required.

*School Hygiene.*—Only 18 of the schools reporting offer courses in school hygiene. Most of these, likewise, are of recent

introduction and contain less than 50 hours of work. It is evident also that very little time is devoted to school hygiene in the 17 schools giving it in combination with other subjects or with other hygiene courses. In the group of 42 schools which give some attention to hygiene only in connection with physiology, 11 mention school hygiene as one phase of the work. Owing to the briefness of the physiology courses, school hygiene can receive little more than mere recognition in these schools.

Both *mental hygiene* and the *hygiene of instruction* received only very scattering mention (12 times in all). Apparently these very important subjects are given little more than the most incidental attention in even the best normal schools of the United States.

On the question of *sex hygiene* returns are available from 84 schools. Twenty-nine of these do not touch the problem of sex hygiene either in direct instruction or in incidental treatment in other courses. Twelve schools answer that they give a course in sex hygiene, but several of these cases are very doubtful. One school is planning to give a course, another gives incidental special lectures, another leaves the treatment of this subject to the lady director of the gymnasium, and still another provides talks by the medical inspector and by the physical director. Thirty-two of the schools which do not give a special course in sex hygiene say that they treat the subject incidentally in other courses.

Dr. Helen C. Putnam found on visiting about 20 cities that a number of them were making the work in nature study and biology contribute in an excellent way to the problem of sex hygiene.<sup>2</sup> That the normal schools are not making the best of their opportunity to train teachers who can use nature study and biology as an approach to the treatment of sex hygiene is evident from the answers received. Of the total number of schools (84) from which returns were received, only 27 answered in the affirmative. Since only five of the 84 schools fail to give one of the biological sciences, it would appear that more might be done in this line than is the case.

<sup>2</sup>Dr. Helen Putnam: *Studies of the Present Teaching of Hygiene Through Domestic Science and Through Nature Study*. Bull. American Academy of Medicine, 1906.

Hygiene may be effectively approached indirectly through the teaching of *domestic science*. However, 38 of the 84 schools do not offer any course in domestic science, and only 15 schools require it to be taken by all students.

The information received on the question as to what efforts are being made in furthering *hygiene practice* is rather meagre, but it serves to indicate where emphasis is being placed at present. Seventy-one schools answered this question. Five say they are making no special effort in this line, while eight others answer in very general terms. Others appear to be making a determined effort. Ten are emphasizing athletics and physical training, 2 have special committees appointed to investigate and report on the hygienic needs of the school, 10 emphasize the cleanliness and sanitation of their school plant, 10 are making special efforts in the way of securing better health supervision by physicians, and 9 are giving special attention to ventilation. The use of paper towels, liquid soap, mopping powders, vacuum cleaners, complete medical inspection records, the improvement of janitor service, reduction of the number of recitations, introduction of hot lunches, and the formation of clubs for the promotion of hygiene are some of the other efforts being made in this field.

In considering the *conditions injurious to the health of students*, no attempt is made to show the status of schools as such. Sixty-seven schools answered this question, and of these 22 say they are free from conditions that are injurious to the health of students. Twenty schools confess to having poor ventilation and six to insufficient lighting. Inadequate and improper methods of heating and too high temperature are reported by four schools, too much stair-climbing by three, overcrowding by three, and the lack of good boarding and rooming places by six. Twelve schools suffer from overpressure of work and too little outdoor exercise, one of these, however, asserting that it is only the dull ones that have to spend too much time reading. Two mention dust, three speak of insanitary drinking cups, and another uses city water containing typhoid germs. One school was described by the State Board as having ideal conditions.

Twenty-five schools have *medical inspection*. Two report



having inspectors who are not physicians, but one of these was specially trained for the work. Forty-six schools have no regular inspection, but six are making efforts in that direction. Four others have indirect inspection, three have it only in the training school, and one turns the work over to the teachers, referring only special cases to a physician. In one school the board refused to grant medical inspection for fear it might seem an infringement on the personal rights of parents! In 16 schools the students have opportunity to observe the work of the medical inspector.

It is gratifying to notice that most of our normal schools have *gymnasiums* in charge of physical directors. Fifty-eight are thus supplied, while 20 report that they are lacking in this particular. Fifty-three schools require the gymnastic work.

Sixty-one schools answered the question relating to the *percentage of students engaging in athletics*. The returns indicate that too few students participate in this form of exercise and that efforts should be made to increase the number. Undoubtedly some students are barred from participating through failure of the school to provide grounds and athletic supplies, and in so far as this is true the condition could be remedied.

*Table Showing Percentage of Students in Athletics in Sixty-one Schools.*

7 schools.....	..
3 ".....	5%
7 ".....	10%
1 ".....	16%
4 ".....	20%
5 ".....	25%
3 ".....	30%
1 ".....	33%
1 ".....	35%
2 ".....	40%
6 ".....	50%
1 ".....	75%
1 ".....	87%
1 ".....	90%
5 ".....	100%
2 ".....	Nearly all.
6 ".....	Few.

The question relating to *recreation* was very general, merely asking whether a majority of students get sufficient recreation. Thirty-three answered in the affirmative, 29 in the negative, while 6 were doubtful.

In summarizing we may say:

(1) That this report is based on returns from approximately one-half of the better class of public state normal schools, and therefore fairly represents the work in hygiene done in the public state normal schools of the United States.

(2) That, on the whole, our normal schools offer, and also require, sufficient science work to serve as a foundation for a good understanding of the various forms of hygiene.

(3) That the best planned hygiene instruction occurs in the schools devoting considerable time to the sciences.

(4) That one-half of the 84 schools give either no hygiene at all or else none aside from that given incidentally in connection with physiology. Nine schools give neither physiology nor hygiene, and those giving physiology devote so little time to it (usually one-half or one-third of a year) that very little can be accomplished in hygiene.

(5) That a good proportion of the instructors in physiology and hygiene in these same schools have university or college degrees and are probably capable of doing better work than their present allotment of time permits.

(6) That 42 schools giving hygiene courses separate from physiology do not do this work at the expense of physiology, but by adding courses in personal hygiene, school hygiene, school and home sanitation, prophylaxis, clinical psychology, sex hygiene, etc.

(7) That separate courses in personal, and particularly in school, hygiene are at least finding a place in the curriculum, though slowly.

(8) That mental hygiene is receiving scarcely any attention.

(9) That comparatively little is being done with the problem of sex hygiene in the way of direct instruction, and that the normal schools are not making the best of their opportunity to train teachers who can use nature study and biology as an approach to this subject.

(10) That 50 per cent. of the schools give domestic-science courses in which some effort is made to emphasize and exemplify the hygienic aspect, and that the number is rapidly increasing.

(11) That in the field of practical hygiene nearly two-thirds of the schools are aware of conditions that ought not exist. Inadequate ventilation, improper lighting, poor boarding and rooming places, and overpressure are the chief conditions of injury to health.

(12) That 25 per cent. of the schools do not have gymnasiums in charge of physical directors.

(13) That medical inspection is being rapidly adopted, but that very few of our normal schools are training student teachers to observe and to make preliminary tests of children.

(14) That athletics and recreation do not receive the emphasis they should in a majority of schools.

(15) That only one school at present attempts to train special teachers of hygiene.

## SCHOOL INSTRUCTION IN MATTERS OF SEX.

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This paper is not intended as a contribution of new facts to the subject it discusses. Facts may be found in abundance—confusing abundance—in the literature of sex-hygiene, which has grown to such proportions of late years that a mere list of references covers several pages. But as is evidenced by this very productivity, there is at present a movement to bring the sex-skeleton out of the closet and into the light, and to see what can be done to make it a respectable living factor, instead of leaving it to make trouble for the inmates of the house. It seems worth while to attempt a selection and concatenation of the facts given us by the workers in the various fields, medicine, hygiene, education, psychology, ethics, and so on, with the aim of arriving at conclusions which help to solve the specific problems of the teacher and school administrator.

The full realization of the need of some means of securing proper attitudes and better conduct in the sexual realm has come comparatively recently. Probably the most strenuous influence in the movement for amelioration has been the knowledge of the wide and ever-increasing spread of venereal diseases, together with new knowledge of their subtle nature and terrible and far-reaching effects. Physicians declare that 60 per cent. of men become infected at some time during life; that besides the direct misery that they entail, these diseases are by far the most potent factors in the causation of deaf-mutism, idiocy, insanity, paralysis and locomotor ataxia; that much of the ill-health of women, 80 per cent. of the inflammatory diseases of women, are due to gonococcus infection alone; that 50 per cent. of ophthalmia and 20 to 25 per cent. of all blindness is due to the same cause; that 50 per cent. of infected women are rendered sterile by it; that 60 to 80 per cent. of children infected with syphilis die at birth or come into the

world with the mark of death upon them, while the rest are subject to degenerative changes which may be passed on to the third generation. And in common with these diseases, sexual disorders, such as phobias, obsessions, hysteria, masturbation and sexual perversions, are so common and so uncertain of cure that we are absolutely driven to the far more important problem—that of prevention.<sup>1</sup>

So much for the diseases and abnormalities. These are not the only dangers. Of late what is called the dynamic school of psychologists has shown us how in a hitherto scarcely conceivable way and to a hitherto unthought-of degree, healthy mental life depends upon proper enlightenment and training in sexual matters, especially in very early life. We cannot here detail their methods and conclusions. The facts and their educational bearings have been presented in this JOURNAL in an article by Jones (7), entitled "Psycho-Analysis and Education." One short quotation will show the nature of his conclusions. "Experience teaches that when later interests, desires and ambitions are traced to their origin, far more than are commonly thought are found to arise in the psycho-sexual instincts. \* \* \* This really follows from the view that mental life is evolved in the individual from the inborn instincts; for of all these the sexual ones are the most fundamentally important, certainly from the point of view of mind; it is the manifold richness of his sexual life that biologically most distinguishes man from the lower animals."<sup>2</sup>

Physicians and psychologists, however, are not the only ones who are beginning to realize the need of a change in our methods of preparing the young for modern life. The criminologist, the social worker, the minister and the teacher realize it also. The common man, as education becomes more general and more generally advanced, can see that life conditions are changing, and that the old insistence on silence about sex topics and the old teaching that all sexual feeling is low and bad must soon be superseded. It has become apparent, even on common-sense grounds, that the young must be impressed

<sup>1</sup>A. S. S. M. P., Leaflet (1), reprinted from Morrow (11). See also Henderson (6), pt. 1, A. S. S. M. P. (1), Pam. No. 3, and Ellis (4), pp. 319-331.

<sup>2</sup>Jones (7), p. 500. See also references there given. Ellis (4) and Hall (5) express somewhat similar ideas.

more and more with their responsibilities, and prepared more definitely for meeting actual conditions.

Will instruction prevent? Instruction here is no more a cure-all than it is in other fields:—but that is fundamental; that it is the best and most powerful means as well as one of the most neglected ones—on this, the authorities are agreed and emphatic. They point out that it is not a question of silence versus teaching, but of good versus bad instruction. The child is bound to get answers to his questions from some source. Denying the need of instruction is like holding it unnecessary to furnish pure water to drink when there are plenty of puddles in the street. The real reason for maintaining silence is a false modesty or foolish sentiment, together with an ignorance of the importance and necessity of teaching, rather than a reason based on theoretical objections to enlightenment. One could quote hundreds of passages. A few will suffice. “While there are other causes which contribute to the spread of these [venereal] diseases, the basic cause is ignorance.”<sup>3</sup> “I am now convinced that the uplifting of the morality of our people lies, above all and everything else, in educating the children, rationally and morally. I believe that more evil has been done by the squeamishness of parents who are afraid to instruct their children in the vital facts of life than by all the other agencies of vice put together. \* \* \* Thousands of men have asked me why they were not taught the dangers of vice in their youth, and I have had no reply to make to them.”<sup>4</sup> “At best, law, police and government can do little more than affect the external conduct. \* \* \* We must look to some influence far deeper and more pervasive for the ultimate self-regulation of life in accordance with the laws of social welfare and the noblest life. This influence is education, and we turn, therefore, from the medical profession and the statesman to that profession which deals with the character, the will and the moral nature in the most direct and persuasive way; we make our appeal to the school teachers and parents.”<sup>5</sup>

<sup>3</sup>A. S. S. M. P., Leaflet (1).

<sup>4</sup>Bishop of London (2).

<sup>5</sup>Henderson (6), pt. 1, p. 74.

"No doubt is any longer possible as to the absolute necessity of taking deliberate and active part in sexual initiation."<sup>6</sup>

Even if the dangers we have mentioned did not exist, instruction should still be maintained. To eliminate the unnecessary worry and self-approach of the uninstructed adolescent, to overcome the deceit and hypocrisy which he is forced to maintain toward his parents and others who insist on silence on sex matters, to set right the false ideas and ideals which this attitude on the part of others causes him to develop, we must see that the truth is taught in a proper and natural way.<sup>7</sup> In conclusion, we see no good reasons why instruction should not be given, and with the foregoing in mind we can certainly maintain the real and pressing need for giving it.

We come now to the problem of the time for instruction, and to the question as to who should give it. The psycho-analytic investigations above referred to have shown that real desires for knowledge of sexual matters arise in children very much earlier than we are accustomed to think, and that if true explanations are not given, false ones are sure to be heard or invented, probably with serious results.<sup>8</sup> It is to be pointed out that to the young child sex matters are not different from other matters till the attitude of the teacher makes them so; that a proper attitude toward sex can be developed, provided the real facts are frankly and simply told. Later, such an attempt will probably have to overcome acquired ideas and feelings of shame and embarrassment.<sup>9</sup> It should be a rule to answer questions and to satisfy curiosity as soon as it arises, not making sexual enlightenment an isolated or specially emphasized, but a natural and integral part of general enlightenment.<sup>10</sup> Certainly all authorities agree that a good ground work, a satisfaction of all insistent curiosity, should be secured before

<sup>6</sup>Ellis (4), p. 43.

<sup>7</sup>On adolescent worry and false ideas, see Hall (5), I, pp. 457-468; on distrusts, see Lyttleton (10), pp. 16-23; Jones (7), pp. 510-512.

<sup>8</sup>We are just beginning to realize the character and complexity of sexual interests in early life, and to catch hints at their growth and transformation into later trends. Seemingly small things in the way of information, circumstance or training may be of profound significance for directing these early tendencies, either towards the establishment of the normal or towards raising one or more of them to the rank of a perversion.

<sup>9</sup>Schmitt (15), p. 235.

<sup>10</sup>Ellis (4), pp. 48-49; Lyttleton (10), pp. 69-70, 79-81.

the child goes to school or otherwise becomes open to sources of misinformation and danger. If information has not been given by this time, the teacher is no longer so free to speak, nor so influential, so that the words are either left unsaid or come with little force.<sup>11</sup>

There has been much discussion on the question of pre-versus post-pubertal sex instruction. The answer must of necessity be: "Both." Sexual enlightenment, like any other enlightenment, should be continuous, progressive and suited to the development and needs of the learner. The young child requires control and simple facts; the boy at school has needs and interests at quite a different level. The marking off of a specific time for a general and complete (?) instruction is certainly not to be recommended.

Since, then, instruction should begin thus early, and since the mother is the natural teacher in early years, as well as the one most likely to be influential, there can be no question but that she should begin the instruction.<sup>12</sup> But the mother's teachings, of which the aesthetic elements are more important than the informative, must always be supplemented by that of the school. At the present day mothers are generally ignorant of the biological and physiological facts that should be common knowledge. Many not actually ignorant are unwilling to teach. If the children of this and the next generation are not to take a similar dangerous attitude, we must train them in the school to the right ways of thinking.<sup>13</sup> Leaving the subject of reproduction out of the textbooks and shunning all references to matters involving sex in biology or history or literature, or what not, is completely contrary to the spirit of the whole movement toward right thinking. The teacher, who is with the child for so much of the time, who has such a powerful influence and such magnificent chances for imparting proper knowledge and ideals, certainly cannot escape the responsibility of treating sex matters.<sup>14</sup>

It would be foreign to our purpose to detail the part in this instruction which may be taken by the doctor. Suffice it to say

<sup>11</sup>A. S. S. M. P. (1), Pam. No. 2, pp. 10-12.

<sup>12</sup>Ellis (4), pp. 48-49.

<sup>13</sup>Jones (7), p. 515.

<sup>14</sup>Henderson (6), pt. 11, pp. 27 ff.



that his training and the confidential relations which he sustains to the patient make him a natural, direct and influential teacher. His words in a personal talk or in a lecture will be listened to by the older boys, who would be more apt to disregard the same admonitions from other sources. There is a real chance for the minister or Sunday-school teacher also, provided he really has the child's confidence and can talk plainly and not too 'preachily,' but unfortunately most religious teachers cannot do so, and do not consider that such subjects lie within their province.<sup>15</sup>

We now come to the fundamental questions of instruction itself, namely, what should be the content of instruction, and what means are most suitable for the presentation of this content? We have already given some indication of the answer when we insisted that different content should be given at different stages of development of the learner. We may, for convenience, treat of three periods: the home and kindergarten stage, the pre-pubertal stage and the adolescent stage.

The training of the first stage, as we have suggested, belongs chiefly to the mother. The kindergarten or grade teacher is called upon so urgently chiefly because there has been total neglect or actually bad home training, for which she must make up as best she may. The sort of training required is admirably set forth by Ellis (4), and there are a number of little books which he refers to, as well as some more recent ones, which present the subject simply and briefly. But we doubt that most mothers need to read these books in order to know what to say. Ellis remarks: "I may add that while it would usually be helpful to a mother to be acquainted with a few of the booklets I have mentioned, she would do well in actually talking to her children, to rely mainly on her own knowledge and inspiration."<sup>16</sup> The training in this period should include the formation of habits of cleanliness and care of the body, the implanting of the feeling of its sacredness, the imparting of simple facts as to the origin of babies and as to the functions of the reproductive organs. The child should, of course, be

<sup>15</sup>Ellis (4), pp. 48-53 and references there; Lyttleton (10), pp. 78-87; Henderson (6), pt. II, pp. 28-30; Lowry (8 and 9).

<sup>16</sup>On the place of religion in this regard, see Hall (5), I, pp. 463 ff; Lyttleton (10), note, p. 97.

warned not to discuss these matters with outsiders any more than he is to discuss any family affairs with them. He should be made to feel free to ask mother any questions he likes, and should be assured of a correct answer. The matter must be treated with absolute frankness and honesty if one cares for the best results. Opportunities for talking of sex matters in a natural context should not be neglected. Many recommend using the facts of reproduction in flowers and animals as a proper introduction to the essential facts of human reproduction. While such facts are extremely valuable in proper hands for the illustration of certain points or phases of the matter, it seems not at all necessary that the mother should know them in order to do good. Far too often such illustrations serve merely as hints at the truth, as excuses for not being frank, and leave the child with the impression that the subject is being skimmed over because it isn't nice.

And with regard to training or instruction, let us here add that by these terms we do not mean the mere giving of information. It is important that besides knowledge—even more than knowledge, perhaps—there shall be imparted right feelings, right attitudes and points of view, right habits and right ideals. As a recent writer<sup>17</sup> puts it, we need a “consecration of the affections” rather than a purely factual sex-hygiene. He insists that the teaching, “If you're bad, you'll suffer,” isn't always true. Even if it were, it would lead to a pretty cheap sort of morality. It will not, moreover, accomplish results. Their superior knowledge of the effects of morphine does not prevent doctors from being the worst offenders in the drug habit. We hold opinions and regulate conduct as we do, far more because the people we like think and act in that way, than because we reason from facts or consider results. The personality of the instructor, therefore, his attitude toward his subject and toward life, undoubtedly play as important a part in results as do the facts he teaches. One experienced teacher says: “The real answer to the question of the two methods [the informatory and the personal] is that they both ought to be combined, and that by far the greater stress should be laid on the personal appeal. \* \* \* Granted that a father's

<sup>17</sup>Cabot (3).

lesson about plant life is immeasurably better than the unclean hints gathered from other sources, which is all that most children have to be satisfied with at present, still such a lesson would be grievously defective in its power of appeal, because it would leave out of account the two greatest influences which a child is capable of feeling—religious reverence and his love for his mother; the first not necessarily, but very probably. It may be reasonably asserted that the wholesome impressions of childhood, which consciously and vividly last through life, are those made by one or both of these influences.<sup>18</sup>

The instruction in the pre-pubertal period should be an enlargement on the subjects treated in the first stage, together with specific preparation for the changes of puberty. There should be an explanation of sexual experiences (nocturnal emissions, menstruation, etc.) and their hygiene.<sup>19</sup> There should be specific warnings against masturbation and bad company, with explanations of the why of present and ideal attitudes and conduct. The child should be made to feel free to ask questions of, and listen to some wise and sympathetic older person with regard to the psychology, hygiene and ethics of sex. This much of the instruction again would be best if given by the parents, for naturally they could be more personal and confidential and intimate than any others. Rarely only, it seems to us, could the teacher do so well. His instruction will, in most cases, be more indirect and objective and informative, resulting chiefly from his attitude toward the sex matters involved in his subject, and from the facts given in the biological courses. Personal talks on sex topics by him ought to be optional and the occasions dictated by common sense, just as are personal talks on religion or choice of a profession.

Much has been said for the courses in the biological sciences for teaching these personal lessons, as well as the more purely informative facts of reproduction which lie strictly within their province. Courses have been given with these things in mind, and the reports are decidedly favorable.<sup>20</sup>

There are a number of reasons, however, why it seems

<sup>18</sup>Lyttleton (10), p. 77. Cabot (3), p. 119, goes so far as to maintain that the "contagion of personality" is "what keeps any of us straight."

<sup>19</sup>See Hall (5), 8; Ellis (4), esp. p. 64.

<sup>20</sup>Henderson (6), pt. II, p. 26.

hardly likely that such courses alone will be adequate. For the most part, they are given in the high school, and hence come too late to be of greatest benefit. The content which strictly belongs to them is not sufficient. The teacher must usually be objective, and cannot well bring in either the more personal facts or their applications without forcing. Most teachers are not prepared to give such courses. And lastly, the subjects themselves, as they stand, are not suited to teach all the lessons we want. Henderson says: "Nature study is a good introduction to sexual pedagogy, but it is not adequate and complete. This is because man is not only an animal, a nature object, but vastly more; he is a person, a moral being, self-directed, and also under social law and spiritual obligations.

\* \* \* The youth needs to know the historical origin of social inhibitions, shame, modesty, marriage, etc., and their reasons in physiology, economics and the necessity of building up character by self-control."<sup>21</sup> Cabot also objects to regarding such teaching as altogether good or adequate. "There is nothing about Nature that should make us look up to her as a source of good example in this field. The behavior of most of the insects and animals that we see about us is far from being a model for human beings in the relations of sex. All that we can get from nature here is an awful warning as to the depths to which we might conceivably fall. The promiscuous and temporary character of the relations observable among most of the animals which we see about us in civilized life is precisely what we wish to avoid in the relations of men and women."<sup>21a</sup> It seems necessary in general, therefore, that the courses in biology should be at least supplemented by more personal and direct means. There is much to be said in favor of special lectures by the biology teacher, a doctor or some other competent person. Considering actual present conditions, the usual custom of segregation of the sexes and optional attendance is probably wise.<sup>22</sup>

<sup>20</sup>Phelps (12); Putnam (13 and 14). Henderson (6), pt. II, p. 78 ff., and Talmey (16), pp. 71 ff., outline courses. See also A. S. S. M. P., Pam. No. 2, pp. 6-8.

<sup>21a</sup>Cabot (3), p. 118.

<sup>22</sup>Zemmer (17) gives an account of such lectures, but those he gives seem hardly complete and detailed enough, nor entirely suited to his auditors.

There is still another means to be mentioned which, in the hands of an earnest administrator, would seem to have great possibilities, since, if successful, it goes well to the root of the matter. We refer to parents' meetings, at which the principal, a doctor, a minister or some other earnest and well-educated man can show the parents the need and possibility of giving their children instruction in sex in the home and the desirability of permitting such instruction by classes and lectures in the school. It assuredly seems to us that this sort of education of the parents can go a long way toward removing the ban on the consideration of sex.

Before the child leaves school there should also be given the instruction we have spoken of as coming in the adolescent stage. No child should be left entirely ignorant of the fundamental meaning and duties of marriage, of the facts of prostitution and venereal diseases, and of their results. Young people should be taught how to regard these matters rationally. Perhaps by this time the child will be far enough developed so that a means not hitherto spoken of, namely, books, may be used in connection with other means.<sup>23</sup> We are inclined to think that the use of books in the earlier stages is not of great advantage. They do not give the personal touch that we believe is so fundamental, but oftentimes serve rather as an excuse for omitting the personal talk. Most books are one-sided; practically all of them are incomplete in some respect. Many exaggerate and attempt to scare the child into virtue. On the contrary, the child should be told the real facts and be sure of sympathy.<sup>24</sup> Quack books and quack doctors are blamed for much of the worry which the uninstructed adolescent undergoes.<sup>25</sup>

Besides instruction in a narrow sense, we may mention various other means which serve more indirectly for the proper regulation of the sexual life. Interest and participation in athletics and social affairs, in literature, poetry, language, religion, and so on, the filling of the youth's mind with a lifework and the directing of his energies toward it, all help

<sup>23</sup>Morrow (11), Ellis (4), and Lyttleton (10) are good.

<sup>24</sup>Lyttleton (10), pp. 92-97.

<sup>25</sup>Hall (5), I, pp. 463-464.

to "long-circuit" his instinctive tendencies (Hall), "sublimate" his desires (Jones), "transform his vital energy" (Cabot).

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## AN EXPERIMENT IN TEACHING SEX HYGIENE.

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In 1908 I first became interested in the problem of presenting to boys of 13 to 15 years of age the essentials of sex hygiene. Feeling that progress could come only by experimentation, I began in that year the experiments which have resulted in the following method. The method is pursued in connection with our first year course in "Civic Biology." This course is required of all our first year boys and continues for forty weeks, four periods per week. As it differs from the ordinary course in general biology only in the stress it lays on biological processes which are of economic importance, the method developed for the presentation of sex hygiene could be introduced with equal success into any course in general biology.

The biological course is the ideal medium for this work for many reasons. Biological functions are two in the main—Nutrition and Reproduction—and while in most courses more stress is laid upon the explanation of nutrition, it is a simple and natural matter to restore the balance by a little more attention to the other phase. Again, the best method of treating ignorance in sex matters is, to borrow a medical figure, gradual inoculation to the attainment of immunity rather than attempted condensation into one or two talks of the essentials of the process with the attendant danger of stimulating morbid curiosity or inducing mental indigestion. The subject matter, the method of presentation, and the wide opportunity for comparative treatment make a course in biology ideal for securing gradual acquaintance with the desired facts, and the very naturalness of their introduction into such a course removes the feature of self consciousness.

The idea of a biological introduction to the subject is of course, not a new one. Most of those whose suggestions I have consulted, however, recommend an approach to the subject through a study of the evolution of sex—using cryptogamic botany as their medium. I have always felt that such a method forms so indirect an approach and so adroitly conceals its purpose as utterly to defeat its end. The pupil never really grasps the personal, human application, and his power of reasoning from analogy is extremely limited at this stage in his mental growth. At any rate, the solution of my own problem demanded a shorter and more direct method, and while I felt the necessity of developing the subject on broad lines in order to clothe it with its proper dignity and perspective, I felt that the pupil should realize from the first what the problem was which he was investigating.

Another factor that enters into a laboratory experiment with human beings is the necessity of the operator's never carrying the experiment to a stage where it may result in harm to the subject. In an experiment with animals of a lower order we often determine the limits of the experiment by defining first its maxima, then its minima and selecting the mean. With pupils I had to be eternally cautious of arousing morbid curiosity in personal experiment which might not only defeat my purpose but even result in bodily injury. This fact has made progress necessarily slow, and the present method represents the result of successive experiments with four sections of boys of some 200 per section for the development of the method; and confirmatory experiments with three other sections of the same size to establish lines of criticism and improvement. In point of time the experiments cover three school years. The subjects were the boys of my own classes in the New York High School of Commerce.

Finally, I do not present the method as ideal or free from objection, but merely as a record of progress and in the spirit of research.

#### METHOD.

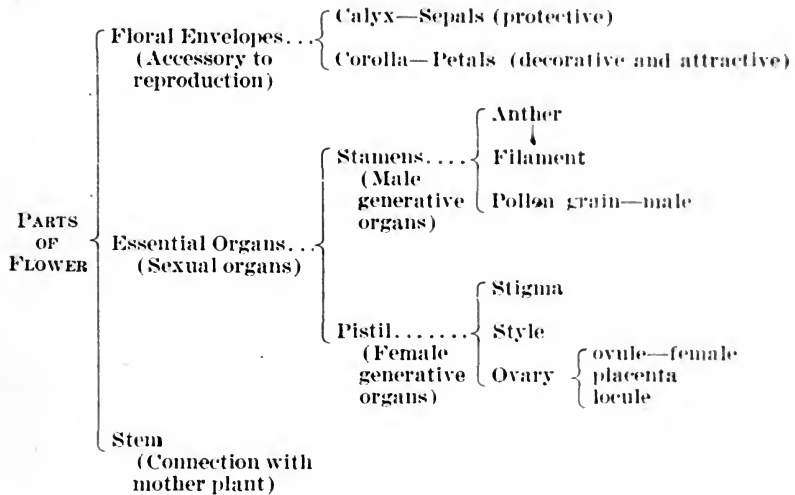
The teaching was associated with four distinct phases of the biological course and was included with other features of such phases.



- A. Flower Study.
- B. Animal Reproduction.
- C. Bacteriology.
- D. Human Physiology and Hygiene.

### A. *The Flower Study.*

1. By the use of a model I first make clear the location and sexual relationships of the flower parts. The following tabulation aids in this and indicates the parts to which attention is given.



By laboratory dissection of various flowers familiarity is gained with the location and names of the above parts and the meaning of sterile, uni-sexual and bi-sexual learned by comparison of actual types. No stress or time is put upon the study of definitions such as complete, perfect, syngenesious, etc., etc. These terms are of no value except as vocabulary to the student of classification in the use of a manual. They cloud the point of view that I try to make apparent from the start, viz., that we are trying to learn the method of reproduction used by a plant.

### 2. Use of the parts.

Study of a germinating pollen grain (germinated in syrup) teaches the parts of this organ and the means it employs to

transport its contents. The significance of shape, male nucleus, vegetative nucleus, "stickiness" and dryness are all considered as they are observed.

Study of a bean pod with the same attention to details of observation brings out all the relationships of an ovary. Supplementary microscopic sections show the relation of egg cell and ovule coats to the future seed and embryo. The first idea of mother care is shown by analogy in demonstrating protective wrappings and feeding arrangements.

The study of pollen-bearing insects and the devices used by flowers for the transport of pollen brings out the accessory relations of the floral envelopes to the process. This study also arouses curiosity as to why plants are so anxious to transfer this pollen and suggests the idea that cross pollination is in some way a thing to be desired.

### 3. Fertilization.

Charts and sections make clear the machinery and process of bringing the male nucleus in contact with the female nucleus, and the curiosity aroused as to pollination is answered in seeing the effects produced by the fusion of the male and female elements, causing the latter to develop into the baby plant.

At this stage the following points are clear:

(a) The universal form of flowering plant reproductive organs and the language used to describe them.

(b) The necessity of getting the male element in contact with the female.

(c) The stress plants lay on cross as distinct from self-fertilization.

(d) The machinery of getting the nuclei in contact.

(e) The dynamic results of the stimulus thus applied to the egg cell in producing cell division and growth to baby plant.

(f) The meaning of maternity in terms of protection and nursing.

### 4. Heredity and hybridization.

At this point general discussions and review of experiences develop

(a) The meaning of heredity and hereditary "characters."

(b) The part that must be played by nuclei in transmitting these characters.

(N. B. I do not of course go into details of chromosome division with pupils of this age, but simply show by elimination that the nuclei are the only media through which a baby plant can obtain the characters of its parents.)

(c) The significance of hybrids and hybridization and the commercial and economic value of such knowledge to man in breeding.

(d) The danger of not securing variation and response to changed environments when cross pollination is prevented.

The lack of suitable texts in all this work I have overcome by summarizing on mimeograph sheets the points I develop in a recitation period and giving these out *at the close* of the recitation for study and review. This method is, I believe, better than any text, as it prevents reading ahead, and allows an inductive development of each point in logical sequence.

#### 5. Plant Breeding.

A study of the methods in use by plant breeders now follows, and the rôle of such factors as heredity, hybridization, variation and selection in the process is developed in the same manner as the points in 4. Such discussion invariably brings out comparisons with animal breeding methods and paves the way for the division B of our method. It also gives an ideal opportunity for the discussion of natural selection and evolution.

#### B. *Animal Reproduction.*

Quite apart from the study of zoology in general I have found it wise to bring in at this point a study of animal reproduction, and the use of the fish and fish hatchery methods permits the development of the following topics and comparisons:

##### 1. Fish and Fish Hatchery.

(a) The location by dissection of spermaries and the production of milt.

(b) In similar manner the location of ovaries and the production of roe or eggs.

(c) The law of uni-sexuality in fishes.

(d) The composition of milt and the character of the mixture of sperms and nutritive material.

(e) The parts of a sperm and comparison with a pollen grain.

(f) The parts of an egg and its food supply. Comparison at this point with hen's egg and ovule.

(g) The machinery of bringing sperm and egg in contact used first by the fish hatcher and second by the fish itself. The relation of this process to pollination, fertilization and development.

(h) The low maternal interest in this process and its wastefulness.

### 2. Development of an Animal Egg.

Study of developing frog's eggs in the laboratory to see process of cell divisions and differentiation. Models help this phase of work.

### 3. Evolution of Maternity.

A study of the evolution of maternity and the reduction of eggs necessary to secure perpetuation of species makes an ideal introduction to the consideration of the various changes in reproductive processes exhibited by the higher vertebrates. In the light of economy viviparousness and oviparousness are easily compared and the necessity and the significance of copulation are easily discussed and elucidated.

### 4. Animal Breeding.

Review of plant methods and extension to animals is obviously simple at this stage. Charts showing human sex elements are also shown at this point and the relation of semen to milt made clear.

### C. *Bacteriology.*

This subject is introduced here to show a simple process of reproduction, but in the main to teach the relation of bacteria to the production of disease. The method of presentation follows:

1. The preparation of Petri dish cultures and test tube cultures and culture media with the food idea prominent.

2. Exposure of these preparations to various sources such as tooth scrapings, nail parings, air, hairs, coins, pencil points, drinking cup edges, milk, water, etc., etc., ad lib.

3. Incubation and laws of conditions favorable and unfavorable to growth shown by experiment.

4. Studies of colonies in gross and in smears (alive and stained) on slides.

Having learned by direct experimentation to recognize the appearance, structure, and conditions favorable and unfavorable to growth, the discussion of effects, and especially disease effects, follows. The points considered are:

(a) Demonstration of typhoid, tubercular, diphtheria, etc., forms with the microscope.

(b) Preventive measures and sources of infection involving explanation of antiseptics, disinfectants, preventive measures to secure uncontaminated food and drinking supplies, toxins and antitoxins, value of personal and civic cleanliness, etc., etc.

#### D. *Human Physiology and Hygiene.*

In this work the points applied are:

1. A study of the disorders of the mouth, nose, teeth and throat and the need of care to prevent infection.

2. In connection with digestion the intestinal disorders and the relation of constipation and diarrhœa to the same bacterial influence.

3. Value of pure food in connection with discussions of nutrients and food selection. Danger of drinking cups.

4. Care of skin and bathing.

5. Dust and its relation to tuberculosis and diphtheria.

It is then a simple matter to allude to the peculiar proneness of the sexual organs to infection and the consequences of abuse or infection through ignorance.

#### *Comment.*

The above method proves with my pupils a logical, simple and interesting process of enlightenment. Its development results in a frank expression of views and inquiry with as little self-consciousness as one finds in a body of scientists when discussing a so-called "delicate subject." I attribute a large part of this result to the vocabulary the child gains which enables him to clothe his inquiries in forms that do not embarrass him. Morbid curiosity never apparently develops, due probably to the fact that the question is answered almost as fast as it is formulated. The "snicker," "side glance of conscious entering on forbidden ground" seldom appear now, and as a matter of fact I have long since ceased to fear these. As a rule they mark a half knowledge which when it is fully en-

lightened removes the impulse which generated these self-conscious expressions. The increasing frankness of discussion as the days go by destroys all these false-modesty ideas of the ignorant boy.

I must warn the teacher who tries this method, however, that it is as necessary to watch himself as to watch the boy. Diffidence, self-consciousness on his part or the least indication that he feels the subject indelicate will ruin all his results. I have found that I can now talk calmly and easily with the boys on subjects that at first I slurred over for fear of showing this sense of indelicacy. Such a sense is our heredity birth-right, and in this case we must sell it as fast as possible.

I also wish to state that although the above method has been tried by a man with boys, I see no reason why a similar course with certain obvious modifications could not be taught by a woman to girls. I do not believe in the desirability of teaching sex hygiene to mixed classes of boys and girls. The conditions of the experiment are too difficult.

I may add, finally, that the same general plan of presentment developed in lecture form for those who have no opportunity to take a biological course works out well in the cases I have personally tried, viz., with certain private school boys. I do not recommend this plan, however, when it is possible to combine the teaching with biology.

## COMMUNICATIONS AND DISCUSSIONS.

### PRACTICE SCHOOLS IN UNIVERSITY DEPARTMENTS OF EDUCATION.

This communication aims to present some of the results of an inquiry recently made by the writer concerning the general topic of Practice and Experimental Schools in University Departments of Education. Replies were received from 33 state universities, 25 privately endowed universities and 15 colleges. The data, while gathered for our particular use at the University of Texas, indicates tendencies of a general interest in regard to the development of some of the practical aspects of education when based on demonstration, experiment and practice. These tendencies may be summed up briefly as follows:

*There is an increase in emphasis on observation work and practice teaching in State universities.* This emphasis is also present, but to a less marked degree, in the privately endowed universities and colleges included in the study. Observation work has been started at Alabama, De Pauw, Denver, Howard, Kentucky and Pennsylvania universities, and Beloit, Coe and Earlham colleges since a report was made in 1908-09 by Professor George Drayton Strayer.<sup>1</sup>

Professor F. E. Farrington found in 1908-09 that among 51 universities and colleges, 16 required practice work, 14 made it optional and 21 did not have it. The universities of North Dakota, Pennsylvania, Virginia and West Virginia, and Wellesley College (which were included in his last group of 21 without practice teaching) are now pursuing practice work under the supervision of the departments of education. In addition, the University of Alabama, the University of Denver and Coe College are now conducting practice teaching in the public schools of their respective cities. The University of Nevada is expecting to take up this work in the near future, and Howard University, the University of Pittsburg and Swarthmore College are arranging for practice work next year.

<sup>1</sup>F. E. FARRINGTON, G. D. STRAYER AND W. B. JACOBS: *Observation and Practice Teaching in College and University Departments of Education*. The University of Chicago Press, 1909. Pp. 80. Price 53 cents.

*Practice schools are being organized under university or collegiate control in order that the teaching may be systematically directed; that the demonstration work may be given to the best advantage, and that the problems in experimental education may be worked out according to laboratory methods.* Farrington's report showed that 12 universities had practice schools under university control, and that 6 universities—Kansas, Michigan, Mississippi, Ohio, Texas and Wisconsin—had definite plans for establishing model practice schools. Since this report was made (1909), the universities of Kansas<sup>2</sup> and Mississippi have postponed their plans for the present, and Illinois, Georgia, Oregon and West Virginia are planning to establish such schools at an early date.

The schools so far established are called practice schools, model schools, elementary schools, university elementary and high schools, or are given the name of the donor or the name of a noted educator. The number of grades in most instances ranges from the first to the high school inclusive, although a few include high schools only, and some others kindergarten, elementary school, high school, normal school and college.

*The following table gives a summary of the Model, Experimental and Practice Schools under University or Collegiate Control.* It includes the number of pupils, teachers, grades and cost of tuition in each and a relative estimate of the cost of buildings, equipment and annual maintenance. The conditions vary greatly in the several institutions, and it is not possible to reduce the costs to a common basis for comparison, since some amounts include new buildings, others very old buildings, and a few additions to old buildings. In several instances the schools are conducted in one of the main buildings of the university. The figures in *italics* refer to *proposed* organization or expansion.<sup>3</sup>

<sup>2</sup>The University of Kansas announces the establishment of practice teaching this year in the Lawrence public schools.

<sup>3</sup>The material presented in the table was submitted with the understanding that a report of the inquiry would be published.



# PRACTICE SCHOOLS IN UNIVERSITIES.

Institution.	Cost of Building.	Cost of Permanent Equipment.	Cost of Annual Maintenance.	No. of Pupils.	No. of Teachers.	No. of Grades.	Cost of Tuition.	Annual State Appropriations.
Arkansas.....	(In Main Bldg.)		\$3,000	75	2	Lower 9		
Bryn Mawr.....	(Thorne Fund, \$50,000)		\$129,000	800	34 El.	Kg.	\$150	
Chicago.....	*\$1,000,000		El. and H. S.		49 H. S.	H. S.	\$100	
Columbia.....	*\$600,000	\$100,000	\$200,000	1300	90	Not. S. Coll.	\$10 for Pr. Sch. \$150-\$250 for Model	Grant from university
Illinois.....	*\$150,000			320	17 + 6	12	\$24	
Michigan.....	*\$300,000							
Minnesota.....	*\$100,000		\$10,000	66	4	4	\$10-\$20	\$10,000
Missouri.....	\$12,000	*\$50,000	\$20,000	250	12	12		
Nebraska.....	(Old Acad-emy)	*\$100,000	\$4,500	123	10	Upper 5		\$1500
North Dakota.....	*\$20,000		\$10,000	150	10	H. S.		State tax
Ohio.....	\$150,000	\$15,000	\$15,000	200				\$5000
†Texas.....	\$100,000	\$10,000	\$9,000	200	12	Upper 6		
Utah.....	(Ed. Bldg.)	\$20,000	\$10,000	600	32	12		\$10,000-\$20,000 (From City Bd. of Ed.)
West Virginia.....	\$100,000	\$10,000	\$20,000	200	10	H. S.		None
William and Mary.....	\$5,000	\$1,500	\$5,000	100	6	Kg. + 4 None		
Wisconsin.....	\$150,000		\$25,000	250		6 Yes		
Wyoming.....	\$150,000		\$25,000	250		6		

\*Includes educational building.

†A recent veto to a portion of the state appropriation will necessitate a postponement of action.

At the University of Texas we are planning to begin with a building costing approximately \$100,000. Our aim is to start with the seventh, eighth and ninth grades, and ultimately to expand upward and downward. The size of the grounds, the buildings and all equipment are being planned to admit of future expansion and elaboration; the building is to be a model for the state in lighting, heating, ventilating, library facilities and laboratory equipment. The course of study will aim to be of a type that the state can follow. It will include domestic science and manual arts, and will not be confined to preparatory work for the university, but will aim primarily to meet the educational needs of the public school system of the state. The student body is to be typical of the larger public schools of the state, and in order to get this type of children we are asking the state for annual maintenance in place of private tuition, and we are planning to have a system of scholarships in order to secure a group of students representing various sections of the state.

The school is to be equipped and manned for demonstration, practice and experimental work. We hope to make it the chief means of connecting theory and practice, the center around which the activities of the department will be correlated, and the strongest connecting link between the university and the public schools of the state. It will enable us to "try out" our students in methods of teaching and class management before we send them from the university, and thus will save the smaller high schools and lower schools of the state from being sacrificed as training and practice schools for young and inexperienced teachers.

The school will be a laboratory for the Department of Education, and will offer opportunities for educational research, the testing of educational theories and the accumulation of statistics and other data for the science of experimental education. Some of the advantages of such a school will be that the results will be more definite and reliable, since the conditions may be controlled, tests repeated or modified and a consecutive series of records obtained for comparative study. One great need in experimental education today is for consecutive records which may be arranged serially or chronologically, and a university experimental school will enable us not only to open up various problems, but will make it possible to follow them along with counter or check tests. For example, the pupils may be grouped, and two or more methods of teaching a particular subject

may be paralleled for a few weeks until a unit of subject-matter has been completed, and then definite standardized tests carried through a year, two years or the entire school course and results tested. Such procedure will give a definite basis for work in methodology, and will throw light on the problem of correlation of school studies and the value of continuity in school subjects. The problems of methods of teaching are in the main empirical problems, and it is impossible to work them out *a priori*, by individual experiences or by the hop-skip-and-jump procedure of the average public school.

An urgent need in educational psychology and experimental education is for more careful experimentation and observation on normal children in order that norms for comparison may be established and evaluated. This, in the writer's opinion, may be accomplished best by our universities and colleges establishing psycho-educational laboratories in our practice and experimental schools, where the instructors in charge may accumulate educational data and train graduate and advanced students in such work. The central idea of the experimental phase of our school will be to start all problems in such a manner that they may be followed for a long period of time, when necessary, and all records will be kept on file permanently.

Some problems which we hope to throw into rather bold relief are the grading, reporting and promotion of pupils, the factors involved in the elimination and retardation of pupils, the correlation of subject-matter in the curriculum and the elements of time and continuity in the teaching of subject-matter. The value of the subjects in the curriculum for the pursuit of subsequent subjects will be tested experimentally by dividing the pupils into groups, some of which will pursue certain preparatory studies and others will not, and checking the effects of the preparation. For example, what are the effects on the study of French, German or Spanish when the student has had Latin? When he has not? A limited number of carefully checked cases will be as valuable here as a very large number studied in a general way or for a short period of time. Another general problem which will receive careful attention at the beginning of the work will be an empirical study of methods of socializing the school by means of interclass entertainments, receptions, literary societies, clubs and athletics.

BIRD T. BALDWIN.

The University of Texas.

## ABSTRACTS AND REVIEWS.

### SOME RECENT LITERATURE ON SEX EDUCATION AND SEX HYGIENE.

- RICHARD C. CABOT, M.D. *The Consecration of the Affections (Often Misnamed Sex Hygiene)*. Proceedings of the Fifth Congress of the American School Hygiene Association, New York, 1911. Pp. 114-120.
- CHARLES W. ELIOT, *School Instruction in Sex Hygiene*. (Same. Pp. 22-26.)
- SIGMUND FREUD, LL.D. *Three Contributions to the Sexual Theory*. (Nervous and Mental Diseases Monograph Series, No. 7; authorized translation by A. A. Brill, Ph.B., M.D., with an introduction by James J. Putnam, M.D.). New York, 1910. P. 91. \$2.
- WILLIAM LEE HOWARD, M.D. *Plain Facts on Sex Hygiene*. New York: Edward J. Clode, 1910. Pp. iv, 171. \$1.
- EDITH B. LOWRY, M.D. *Confidences: Talks with a Young Girl Concerning Herself*. Chicago: Forbes & Co., 1910. P. 94. 50 cents.
- E. B. LOWRY, M.D. *Truths: Talks with a Boy Concerning Himself*. Chicago: Forbes & Co., 1911. P. 95. 50 cents.
- WILLIAM D. PARKINSON. *Sex and Education*. Educational Review, 41: January, 1911, 42-59.
- JESSIE PHELPS. *Biologic Teaching of Sex*. American Association for the Study and Prevention of Infant Mortality: Transactions of the First Annual Meeting, Baltimore, 1910. Pp. 291-296.
- CLARA SCHMITT. *The Teaching of the Facts of Sex in the Public School*. Pedagogical Seminary, 27: June, 1910, 229-241.
- B. S. TALMEY, M.D. *Genesis: A Manual for the Instruction of Children in Matters Sexual (For the Use of Parents, Teachers, Physicians and Ministers)*. New York: The Practitioners' Publishing Co., 1910. Pp. x, 194. \$1.50.
- PHILIP ZENNER, M.D. *Education in Sexual Physiology and Hygiene: A Physician's Message*. Cincinnati: The Robert Clarke Company, 1910. Pp. viii, 126. \$1 net.

One need not be a close observer of educational movements to perceive that the problem of sex instruction has assumed new prominence of late. It is a subject of discussion not alone by physicians and social workers, but happily, also by educators, teachers and parents. There are several departments in colleges and in normal schools for the training of teachers that strive to give their students some acquaintance with the biology and hygiene of sex; there are several school systems in which a serious attempt is being made to work out a satisfactory plan for the instruction of pupils, both in the grades and in the high school.

The list of books and magazine articles that have been selected for consideration does not exhaust the publications of the past 12 months that have been devoted to this topic, but it will suffice to indicate the characteristic lines along which it is just now developing. Roughly, we may distinguish in it five types of treatment: First, essays or monographs that discuss the theory of sex, *e. g.*, Freud's "Three Contributions," or that set forth in an extended manner some particular phase of the sex problem, *e. g.*, Howard's book on venereal diseases; secondly, articles that seek to urge the consideration of the problem and to stimulate the reader to active participation in its solution, *e. g.*, the articles by Eliot and by Schmitt, and the first part of Talme's book; thirdly, articles like those of Cabot and of Parkinson that question the wisdom of some of the present tendencies in sex education; fourthly, more or less ambitious programs of instruction (Phelps, Talme, Zenner, Schmitt and Eliot), and fifthly, the "literature of warning", or books designed, like Lowry's, to be placed in the hands of adolescents.

Freud's three essays appear in the translation in substantially the same form as they originally appeared some six years ago, save for occasional footnotes to indicate modifications or confirmations of his earlier position. The fundamental features of Freud's psychology of sex may thus be gleaned now by English readers from his own writings. Freud has shown that sex instincts play an extraordinary rôle in the process of mental development; that psychoneurotic illnesses, for example, never occur with a perfectly normal sexual life; that the process of refining or 'sublimating' primitive cravings renders possible the turning of energy and interest into manifold channels of intellectual and artistic achievement, but that, with equal readiness, the same impulses may deteriorate into perverse manifestations and

unfortunate aberrations. The thesis that the whole progress of civilization is founded on a sublimation of infantile instincts, particularly of the sex instinct, is far-reaching and challenging.

The "first contribution" deals with sexual aberrations, with deviation from normality, either in respect to the sexual object (inversion) or in respect to the sexual aim (fetichism, sadism, masochism, etc., and their relation to psychoneuroses).

The second essay deals with infantile sexuality, demonstrates the existence in early childhood, even from birth, of the germs of the sex instinct, argues that the loss of memory for childhood must be attributed to real 'repression,' sketches the development of the 'psychic dams,'—loathing, shame, morality, etc.—and the consequent appearance of periods of latency in sex development, traces the function of erogenic zones, with particular emphasis on thumb-sucking, and suggests tentative hypotheses to account for the mechanism of 'sublimation.'

The third essay shows the transformation that takes place in the sexual impulses during puberty. The impulse is no longer autoerotic, but finds its sexual object, while a new sexual aim appears—a fusion of the diverse partial impulses of childhood. Complete concurrence of aim and object is essential for normal sexual development. The three essays are summarized in the last ten pages. The exceptional importance of Freudian psychology for education and for personal hygiene cannot escape the reader.<sup>1</sup>

Howard's book is a somewhat rambling, but very vigorous, aggressive and possibly extreme presentation of the prevalence, dangers and social consequences of gonorrhea and syphilis, with a closing chapter on the mental and the physical value of continence.

The author says in his preface: "The fearful havoc the diseases explained in this book are making among the innocent is due to ignorance. It is my purpose in this book to destroy forever this injurious ignorance. This is the only way to stop the increase of the curse that is over all the land."

Even if Howard's assertions need in some cases to be discounted, the situation that he reveals must be astounding to the majority of his readers, and cannot fail to impress in a most emphatic manner the tremendous need for a campaign of public enlightenment. But

<sup>1</sup>Special treatment of these applications of the theory will be found in an earlier article by Jones (this JOURNAL, Vol. I, p. 497).

in what way and to what degree the facts here set forth should be utilized in school instruction remains as yet a matter of debate, as we shall see in a moment.

The thesis specifically defended by our second group of authors, *e. g.*, Eliot, Talmey, Schmitt, that the historic "Policy of Silence" has proved a complete, lamentable and disastrous failure does not appear to be assailed by any writers that have given serious consideration to the situation. Furthermore, I am inclined to believe that the vigorous campaign of the last decade for the enlightenment of the young in matters of sex is slowly conquering the indifference or open hostility of parents and schoolmen. The conviction is gaining ground that it is impossible, save in rare instances, to keep the child from some sort of sex knowledge; that, if left to chance, this knowledge is of the most reprehensible character; that real sex education, when properly conducted, entails no evil results; that parents as a class are unwilling or too ignorant to give the instruction demanded, so that the school, as matters stand, is the logical avenue for this instruction. These statements would, I think, be endorsed by all the authors that we have listed.

On the other hand, neither Cabot nor Parkinson, who are typical of the third tendency in the recent literature, are entirely satisfied with the trend of thought that demands full instruction in the school as to the nature of venereal diseases and that emphasises the consequences of these social pests. Parkinson, for instance, asks whether the modern movement for plain speaking about sex is really remedying matters; whether we can create virtue by dwelling on vice; whether the "plain-truth" literature does not array one sex against the other and engender pessimism and cynicism. "The physician is dealing with the sore. Can the educator get at the source?" Sex ought to be shown as a fundamental dynamic force in human life (*cf.* Freud's doctrine of sublimation). Let us not "proclaim the curse, but still leave the seal of delicacy upon the book of blessing." Incidentally, the page or two of questions with which Parkinson concludes his article will stimulate every reader to a serious consideration of these vexed issues.

Dr. Cabot's attitude, as I understand it, is substantially the same. He insists that sex is essentially a moral problem, not an hygienic one; that it is bad morality to preach virtue for fear of the consequence of sin. Cabot, moreover, contends that the physicians and

biologists who are rushing into print are incompetent to lay down a course of sex education: that is a pedagogical question, and must be settled by educators.

In the light of this contention, it is not without interest to find in our fourth group among those who have tried to lay down a course of instruction two physicians, Talmey and Zenner; two teachers, Miss Phelps and Miss Schmitt, and a prominent educational leader, Dr. Eliot. It would seem to be borne out by inspection of their proposals that the teachers know better than the physicians how to plan a course, but it may not be altogether a matter of chance that the course of instruction that is both ambitious and successful has been developed by a teacher of biology.

Dr. Zenner, it should be said, makes no pretence to special pedagogical attainments: he simply sets forth in his book the results of an 'experiment' conducted by himself and by a woman physician in giving sex talks in a Cincinnati public school. His own talk was very brief, and not so well adapted as it might have been to the age and training of his auditors, yet the effect, he says, was undeniably good. Two talks to college boys are also reported, the one on sexual physiology and hygiene (quackery, masturbation, continence); the other on social diseases. In the remainder of his book, Professor Zenner discusses the feasibility of sex instruction: he believes oral better than book instruction; he would have the teacher co-operate with the physician, and he would begin instruction in childhood and reinforce it at puberty.

So far as we may judge, Dr. Talmey never tried out his scheme of sex instruction, which is obviously so technical as to be impossible in the school, at least so far as "Lessons" three and four are concerned. However, the general plan sounds reasonable. The first so-called lesson concerns the period from birth to four years, and consists simply in protective hygiene (bathing, sleeping arrangements, circumcision, prevention of early onanism, etc.). Positive instruction of an incidental character begins in the second period—4 to 7 years—and consists in straightforward answers to the child's inquiries. Talmey approves Carlton's view that the proper naming of the parts of the pelvic region should be used from the day the child is born.

Lessons three and four, designed for children 7 to 10 and 10 to 13 years, respectively, set forth the details to be taught concerning re-



production in plants and reproduction in animals. Lesson five, for children aged 13 to 16, treats of menstruation and masturbation, while the final lesson, for the years 16 to 18, explains the dangers of venereal diseases. The merits of this book are to be found in the main outlines of the scheme and in occasional suggestive ideas: its faults, aside from the difficulty of carrying out the details of the program, are noticeable in numerous misspellings, *e. g.*, of Freud and of Kraepelin, and in a slovenly style.

Miss Schmitt does not try to specify a program in detail, but cites with approval that arranged by Höller. In general, she distinguishes not five, but two chief periods—the prepubertal and the postpubertal. During the former a course of scientific, objective instruction in sex should be incorporated in the nature study work of the grades and supplemented by sufficient anatomy and physiology to make possible the presentation of sex hygiene, at least in an elementary manner. There need be no segregation of classes during this work, and all gruesome details should be excluded. During the postpubertal period, instruction in the high school should put emphasis on the social and ethical phases of sex.

Dr. Eliot feels that no one can at this time lay down a final program of sex instruction: that will take a long period of experimentation. However, the following principles are, he thinks, already established: The necessary knowledge must be developed by "ample and prolonged teaching of natural history," to include demonstrations of the various modes of transmitting life (cell division, cross-fertilization, pollen carrying, etc.), and so contrived as to convey to children a large stock of objective notions about reproduction before the period of special sensitivity arrives. To meet the needs of those who leave school early, the elementary facts of sex hygiene should be taught to all children just before they reach the age limit of compulsory education. While the effect on the body of social diseases should be given in the high school, the emphasis should be given to the "study of the normal functions of the human body in health." Chastity, continence and allied moral factors should be developed by home, church and school.

At the Michigan State Normal College a course of instruction especially designed for prospective teachers has been developed and presented with marked success by Miss Jessie Phelps. This special course follows two preliminary courses in hygiene—the first on In-

fant Diet and the second on General Hygiene. The special course itself is "grounded in the science of biology," and "develops into the science of sociology." It is concerned, first, with the study of the physiology and hygiene of sex; secondly, with the development of the human being from the ovarian egg to advanced adolescence; thirdly, with the needs and methods of instructing children in some of the more fundamental biological laws of life, and fourthly, with such sociological questions as courtship, marriage, eugenics, heredity and prostitution. Miss Phelps is particularly insistent upon the desirability of the approach through biology, in that it gives objectivity and provides a vocabulary. The teacher's attitude must be that of naturalness, with no apologetics and but little 'preaching.' The pathological aspects are treated briefly, but frankly. We trust the time may come when such courses as this may be a part of the required work in all normal schools and college departments for the training of teachers. Only by the instruction of the school children of today can we bring about the enlightenment of the parents of tomorrow, and only by the training of their teachers can we bring about the instruction of the children.

Finally, a word should be said in commendation of two books by Dr. Lowry that are designed to be read to, or read by, boys or girls between 10 and 14. These little volumes convey a limited amount of information on matters sexual, which is enmeshed in a series of nine or ten "Talks" supposedly given by a mother to her daughter and by a father to his son. The general plan is to pass by steps from fertilization in plants to the rudiments of reproduction in fishes and birds, and thus to lead to human reproduction. The advice in these talks is not limited to sex hygiene, but touches also on digestion, constipation, care of the teeth, sleep, etc. In general, the style of treatment strikes me as excellent for the ages for which the books are intended. It is refreshing to note the absence of sentimentality. Indeed, I cannot see how any parent could object to giving at least this degree of sex information to the preadolescent child. G. M. W.

## NOTES AND NEWS.

What has health to do with morality? Do matters of food, drink and rest have ethical import? There is a strong tendency among **HEALTH AND MORALITY.** practical people to think and act as if ethics had nothing to do with commonplace things. Take the matter of food. The daily paper says that a man has eaten poison, and we pronounce it suicide, one of the greatest breaches of moral law. In another column is the eulogy of a prominent citizen who has reached an untimely end in a common way—to put it in plain English—by wrong eating. These two men have shortened their lives, perhaps, by the same number of years. On the one we heap our disapprobation; the other we mourn with sympathy and affectionate remembrance. But what is the difference between the two cases? The first was sudden; the second was gradual. The essential difference lies in the rate of the killing process. In one case there was a single act of gross violence; in the other a thousand acts naturally linked with cumulative effect, but in both cases the penalty was death.

It is a good fortune that eating is one of the fundamental pleasures of life. Wretched the man who has to eat merely for the sake of sustaining the body! But know how insinuating the temptation is—to eat too much, to eat too frequently, to eat too rapidly, to eat too great variety, to eat when tired, to eat when angry, to eat when we work, to eat improperly prepared food, to eat to please the cook or the hostess, to eat for good-fellowship, to eat the sweets, to eat the sours, to eat the hot, to eat the cold, to eat the fat, to eat the rich, to eat the stimulating, to eat the soothing, to eat to save, to eat to tickle the palate, even to eat to eat. Likewise, in drink, rest, exercise and work there is ever present the temptation to do that which is not good for the system. The message of the teacher of the present generation should be that health is a moral obligation, and there is no other discipline which can impress that fact more effectively than applied psychology.

C. E. S.

At the annual conference of the English Child Study Society, held last July, one of the most important topics of discussion was that of **PROGRESS IN** the teaching of sex hygiene. It is true that there was **SEX HYGIENE.** a note of disappointment and impatience in some accounts of the meeting, and it may be thought that so much talking around the question is symptomatic of a disposition to shirk responsibility in the matter. The teacher shrinks from such a delicate subject, pleading lack of preparation, and passes it on to the physician. The physician realizes that occasional talks on personal hygiene are insufficient, and points out that this is a moral rather than medical question. The clergyman thinks the state of affairs is shocking, and that something ought to be done, but avers that the subject lies within the jurisdiction of the parent, and should be expounded in the privacy of the home. Yet all realize that not one parent in ten is fitted for the task. Thus the burden is thrown back on the teacher, who must train parents in the way they should bring up their children. It is not surprising that some ardent souls grow impatient with these discussions. And yet there is progress. The inertia of tradition and prejudice is too great to yield in a moment. The very fact that the subject is discussed at all in such a meeting is a hopeful and encouraging sign. It is only through widespread publication of such discussions that the public can be aroused to the desirability of making some provision for the instruction of teachers in the fundamental life processes, and thus removing the excuse of unpreparedness.

J. C. B.

It is stated in the daily press that the Chicago Woman's Club is to open a dance hall in one of the congested districts of the city. Dance halls certainly have a powerful attraction for young girls, and it is argued that they would prefer to have their amusement in healthful, pleasant quarters, under clean, decent supervision, rather than frequent the malodorous and disreputable vice traps into which they are now lured. If the experiment proves successful, a number of such dance halls will be opened in various parts of the city.

A party of scientists composed of Professor J. S. Haldane and Dr. Douglas of Oxford University, England, Professor Yandell Henderson of Yale, and Professor Edward C. Schneider of Colorado College have been spending the summer on Pike's Peak, studying the effect

upon the human organism of a prolonged stay in a high altitude. They are all experienced physiologists, who have given especial attention to this subject, and they were supplied with the latest and most elaborate apparatus for measuring physiological changes. At the end of the first two weeks the red blood corpuscles showed a very considerable increase in number, and there was evidence of a decided adaptation of the organism to the rarified atmosphere. According to Dr. Douglas, their observations, which will be published in the Proceedings of the Royal Society, were highly satisfactory, and will settle many disputed points in respiration.

President William T. Foster of Reed College, Oregon, who has made several studies in the relationship between success in life as variously defined and college studies, and who included the results of some of these in his recent book on the "Administration of the College Curriculum" (Houghton Mifflin Company), writes us as follows: "I find increasing interest in this subject of research, because throughout the long history of education we have had such a surfeit of mere opinion in this field. I am further interested because the American College during the past decade has met such a fire of adverse criticism, and because this seems to be justified, if at all, mainly on the ground that college students of today do not regard achievement in scholarship as the main interest of their college work. It is pretty generally agreed that incentives to intellectual effort are highly needed in American colleges. I doubt if we can provide a better incentive than far-reaching statistical evidence that there is a prevailing positive correlation between success in college studies and the kinds of success in life which young men hope to attain. If there is any such positive correlation, we ought to find that out, or discover what is the cause of the discrepancy between the standards of achievement we set up in college and the standards men find in the life beyond commencement." Dr. Foster is continuing his studies on this subject, and would be glad to hear of the results of similar studies elsewhere.

The Wisconsin Legislature has recently authorized the establishment of a demonstration and practice school at the University of Wisconsin, and a suitable building, to cost approximately \$100,000, will be erected at once to house a secondary school of six grades. The

university has already taken over the Wisconsin Academy at Madison as the nucleus of the school.

The School of Education of the University of Pittsburg has established a "Saturday Class" for the training of teachers now in service who desire to secure certificates under the new Pennsylvania School law.

The New York State Education Department has inaugurated in its system of normal schools a plan of specialization in the training of teachers that may perhaps be regarded as one phase of the general movement toward specialized vocational training. The plan is to have particular emphasis laid upon training in music at Potsdam, in music and drawing at Fredonia, in agriculture at Brockport and Cortland, in library work and agriculture at Geneseo, in commercial work at Plattsburg and in industrial subjects at Buffalo.

*Vocational Education.* Edited by Charles A. Bennet. Published in five issues a year by the Manual Arts Press, Peoria, Ill. Vol. I, No. 1. Subscription price, \$1.50. We welcome very heartily the appearance of this journal with an excellent promise in a large field. "Its desire is to co-operate with and be helpful to the great number of educators, men of affairs, manufacturers, social reformers, labor leaders and others who are interesting themselves in working out the problems of education for citizenship in a democracy, and especially that side of such education which prepares men directly for vocations." The first number opens with an article by President Edmund J. James on "Vocational Education and Its Future." One of its most valuable sections is that entitled "Of Current Interest," which is a general review of the situation in vocational education at the present time.

The National Society for the Promotion of Industrial Education will hold its fifth annual convention in Cincinnati, O., November 2, 3 and 4. Opportunity will here be given to see Cincinnati's provisions for industrial education. Papers, addresses and discussions on practical problems of industrial training by speakers of national reputation are on the program.

We desire to call the attention of our readers to the series of Educational Psychology Monographs, four of which have already been issued. Professor Guy Montrose Whipple, of Cornell University, has consented to assume the editorial direction of the series, and prospective contributors are invited to correspond with him in regard to details. The series affords an opportunity for the publication of more extended experimental and theoretical contributions to education than can be accommodated within the limits of a magazine, and we bespeak for it the cordial support of investigators and of the educational public.

The teachers' institute as a means of instruction and inspiration seems to be losing favor in many quarters. Wisconsin and Minnesota have substituted summer schools of six weeks, while New York has abolished its system without at present providing any substitute. The institute was originally designed to assist those teachers, especially in the rural communities, who entered upon their work with little or no professional preparation. Nowadays, when even the teacher of the district school must have some preliminary training, the need for the old-fashioned institute is greatly lessened, and the question arises whether it is worth the time and money that it costs. Possibly the university summer school will come more and more to be looked upon as the logical substitute for the institute. We note that the school authorities in several enterprising cities offer premiums or scholarships to induce their teachers to undertake summer work.

The *Atlantic Educational Journal* enters upon its seventh year with the September number under a new editorial management. The *Journal* is conducted by Mr. H. E. Buchholz, with the advisory counsel of Prof. E. F. Buchner, Johns Hopkins University; Miss Isobel Davidson, Supervisor of Primary Instruction, Baltimore County; Prof. J. M. Gambrill, Baltimore Polytechnic Institute; Prof. John W. Hall, University of Cincinnati; Dr. Frank A. Manny, Principal Baltimore Teachers' Training School; Miss Lida Lee Tall, Supervisor of Grammar Schools, Baltimore County; Dr. James Y. Joyner, State Superintendent of North Carolina, and Miss Rose I. Conway, Illustrator. The September number contains important articles on

current school topics, and should commend itself strongly to practical educators.

*The Teacher* is a new educational free lance issued monthly by "The Light" Publishing Co., 616 E. 181st street, New York City. 50 cents per year. The following is its platform: 1. Representation of the teaching force in the Board of Education. 2. Promotion of teachers and principals based upon experience, general culture, participation in political-social-economic progress, and critical, constructive and experimental work in educational science. 3. An educational system wherein responsibility for any defect may be definitely and quickly placed upon the proper official. 4. More initiative for teachers and principals and abolition of petty supervision. 5. The basing of all educational laws and principles upon experimental pedagogy, rather than upon some official's commands or whims. 6. The doing away with nervous strain and unnecessary clerical work in teaching. 7. Elimination of caprice in the discretionary power of officials. 8. Access by teachers to all official records. 9. Participation by teachers in the election of principals and superintendents.

The International Commission on the Teaching of Mathematics, which is to report at the next triennial meeting of the International Mathematical Congress, to be held at Cambridge (England) in 1912, met in Milan on September 18-20 to take stock of the work thus far accomplished.

Mr. S. A. Curtis, 441 John R. Street, Detroit, Mich., is continuing his investigation of arithmetical abilities by means of the Curtis standard tests. During the past six months 18,000 copies of the tests have been disposed of, and from these returns standard scores for the different grades are being tabulated. Mr. Curtis is now interested in determining standard yearly growths in arithmetical ability. The measurement of the actual effect produced by a year's effort in several hundred schools in different parts of the country will be a valuable contribution to experimental pedagogy. Other problems upon which light may be thrown by these tests are the comparative value of different methods of drill in arithmetic, the extent to which work in any other subject transfers to arithmetical ability and the degree to which arithmetical aptitudes are inherited.



Mr. Courtis is willing to furnish copies of the standard tests at the actual cost of printing and distribution.

Dr. J. Carleton Bell will deliver a course of four lectures on "Contemporary Movements in Education" before the Brooklyn Institute of Arts and Sciences on October 24 and succeeding Tuesdays. The subjects treated will be "Binet's Tests of Intelligence," "Meumann's Studies in Mental Aptitudes and Capacities," "Stern's Studies in the Psychology of Statement" and "Current Educational Activities in Europe."

Prof. Albrecht Bethe, of Strasburg, well known for his studies on the physiology of the nervous system, has accepted a call as professor of physiology at Kiel.

At Cornell University, Dr. Guy M. Whipple has been advanced to an assistant professorship of the higher grade, with the designation "educational psychology," in place of "the science and art of education."

Dr. W. C. Ruediger, assistant professor of educational psychology in the Teachers College of the George Washington University, has been advanced to a professorship in that institution.

## PUBLICATIONS RECEIVED TO SEPTEMBER 1, 1911.

(Notice in this section does not preclude a more extended review.)

ALFRED BINET ET TH. SIMON. *La Mesure du Développement de l'intelligence chez les jeunes enfants*. Reprint from Bulletin de la société libre pour l'étude psychologique de l'enfant, 11th year. April, 1911. Pp. 187-248.

A full restatement of the methods of conducting the Binet-Simon tests, including several important changes from the 1908 order and procedure. Each year has now five tests, and provision is made for 15-year-old subjects and for adults. Review will follow.

LOUIS B. BLAN, PH.D. *A Special Study of the Incidence of Retardation*. New York: Teachers College, 1911. Pp. 111. \$1.

An attempt to measure the relative frequency of non-promotion in the grades of the public school. A study was made of the records of the "initial starters" who have persisted in the present grammar grades of Plainfield, East Orange, Paterson, Elizabeth and one district of New York City, and the author endeavored to ascertain the particular grade in which pupils tend to be retarded. The hardest grade was found to be the seventh.

WILLIAM BROWN, M.A., D.Sc. *The Essentials of Mental Measurement*. Cambridge, England: The University Press, 1911. Pp. vii, 154.

A technical discussion of the theory of measurement applied to mental traits, including the logic and mathematics of the psychophysical methods and of the theory of correlation. This contribution to quantitative psychology is adapted from the author's doctorate thesis on the use of correlation in psychology, and is designed for use by advanced students of experimental and educational psychology.

LUCIEN CELLÉRIER. *Esquisse d'une science pédagogique*. Paris: Félix Alcan, 1910. Pp. xiv, 393. 7.50 fr.

A careful and detailed examination of the fundamental principles of teaching. "Perhaps it will be said that we have insisted too

strongly upon psychological analysis. • • • It was absolutely necessary. Psychology is for the teacher what anatomy and physiology are for the physician." The author considers first, as the factors of education, the child, the environment and the educator, and secondly, the process of education, including the mode of action of the educator and the object of education.

LOTUS DELTA COFFMAN, PH.D. *The Social Composition of the Teaching Population*. New York: Teachers College, 1911. Pp. 87. \$1.

"The specific problems treated are the economic level and conditions from which teachers come, their age and sex distributions, the nationality factor and the group interrelationships of salary, position, training and experience."

CHARLES HENRY KEYES, PH.D. *Progress Through the Grades of City Schools. A Study of Acceleration and Arrest*. New York: Teachers College, 1911. Pp. 79. \$1.

"Potential accelerates are present in our schools in very large numbers, comprising from one-fourth to one-third of all pupils above the first grade. The average accelerate, under favorable conditions, has the capacity to gain from one year in seven to two years in nine of the traditional city school course. The number of such pupils is so considerable as to demand that special provision be made in every school system for freeing their progress through the schools. This service, whether it is to be rendered by special teachers or special classes and in a differentiated curriculum, is too important for society to neglect. While protection against the subnormal is important, and genuine training for the rank and file is imperative under any form of government, the proper care and culture of the element that is to furnish leadership in all our activities is the most important educational function of a democracy."

E. MACH. *Die Analyse der Empfindungen und das Verhältniss des Physischen zum Psychischen*. Sechste vermehrte Auflage. Jena: Gustav Fischer, 1911. Pp. xi, 323. M. 5. Geb. M. 6.

It is almost 26 years since the first edition of this stimulating work came from the press. The great mathematical physicist, abhorring the Kantian metaphysical psychology, struck out boldly with an appeal to the facts of experience and undertook a scientific analysis of the data of perception. While his monism may not be so free from metaphysics as he wishes us to believe, his discussion of sense perception as the basis of all mental activity is fresh and vigorous, and, with the critical comments of this sixth edition, deserves the careful attention of every student of psychology.

CHARLES H. OLIN. *Phrenology*. Philadelphia: The Penn Publishing Co., 1911. Pp. 169.

This book is fairly typical of the riotous crop of mental weeds which the seed of the old faculty psychology sends forth when it falls upon the fertile soil of the phrenologist's imagination.

CLARENCE ARTHUR PERRY. *Wider Use of the School Plant*. New York: Charities Publication Committee, 1910. Pp. xiv, 423. \$1.25.

The results of an inquiry carried on by the Russell Sage Foundation with regard to the utilization of school property after day-class hours. Treats of evening schools, vacation schools, school playgrounds, public lectures, evening recreation centers, social centers, etc. Illustrated by numerous photographs and charts. Designed to show what is being done in various cities, how it was done and what it cost. A valuable compilation.

WILLIAM LOUIS RABENORT, PH.D. *Spinoza as Educator*. New York: Teachers College, 1911. Pp. 87. \$1.

A painstaking study of the educational implications of Spinoza's philosophy.

HENRY SUZZALLO. *The Teaching of Primary Arithmetic*. Teachers College Record, 12: No. 2, March, 1911. Pp. 70. 30 cents.

A masterly presentation of the aims and methods of elementary instruction in arithmetic. It should be carefully studied by every primary teacher.

## PROBLEMS IN THE PSYCHOLOGY OF VOCATIONAL EDUCATION.

DAVID SNEDDEN,

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Within recent years the term "vocational education" has come into fairly common use as designating any kind of education whose controlling purpose is to give preparation for recognized callings or groups of related callings. Medical and other forms of professional training, education for the various commercial occupations, specialized preparation for the various trades and manufacturing pursuits, agricultural education, nautical education, and training for the arts of the household—these are all, where organized toward a preconceived end of efficiency in useful employment, forms of vocational education.

There is a sense in which it may be said that vocational education has always existed and is now universal. All persons, except infants, the aged and other helpless members of society, have always had to exert some strength, skill or cunning in obtaining a livelihood, and for this they have had to have preparation, based on active bodily and mental powers, on the one hand, and experience, accidentally or systematically acquired, on the other. Strictly speaking, there is no such thing as "unskilled labor," but there is much brawn and experience in the labor markets of the world which is available for fairly ready transfer to various occupations requiring only the more common forms of strength, skill and intelligence—qualities which are more or less automatically produced through the growth processes which bring native instincts, like imitation, into conjunction with society's customs.

But it is also true that vocational education of a more or less purposeful sort has long existed. It would seem almost justifiable to designate as a teaching instinct the widespread disposition of elder workers in all ages to enlist in useful employ-

ments, first by suggestion and then by coercion, the efforts of children. The learning instincts of youth are commonly complemented, in the social order, by the teaching instincts of maturity, manifested by parents and others in the social environment. The rites of initiation, while often religious or cultural in their purposes, not infrequently had an intimate bearing on some vocational capacity, like that of soldier, hunter, sailor, craftsman, tiller of the soil or household worker. It is a matter of well-established history that the vocational education of the Middle Ages—that of the professional orders (priestly, military, medical, etc.), commercial guilds and crafts guilds—was the most elaborate the world has yet seen. It was fortified and elaborated not only by the customs and ideals of the period, but by carefully worked out legislation.

When, therefore, we discuss current problems of vocational education it should be with a full appreciation of the widespread historic and contemporaneous existence of more or less imperfect, inadequate and decadent forms of such education. Our discussion assumes the probable evolution of specialized agencies, viz., vocational schools, to procure training which modern social conditions demand and for which existing agencies other than schools seem inadequate. We should furthermore recognize that for certain forms of vocational education, *e. g.*, medical, legal, theological, normal, engineering, military, and some commercial, the usefulness of specific schools as supplanting or supplementing the clumsy, if not futile, methods of apprenticeship or educationally unsystematic participation in the simpler stages of the employment has long been accepted.

The modern demand is not for vocational schools for the so-called professional callings, for which, in the main, systematic preparation is now begun at the mature age of 18 to 22; it is for schools which shall give ordered and effective vocational training for younger learners—those from 13 to 18—and for whom the most promising callings are found in the more or less skilled trades, in commercial occupations, in agriculture and in the household arts. Sometimes this demand is actuated by a conviction that the present non-school agencies are less effective than formerly, both in producing efficient workers and in saving boys and girls from submergence in

unskilled and insufficiently productive labor; and sometimes by a recognition of the fact that in many contemporary callings the entrance of applied art and science has been of such a nature as to create a need for new types of vocational education which can be procured only through school agencies.

Contemporary students of vocational education are convinced that it will introduce new and complicated problems of educational psychology. The elaborate mechanism of liberal education which has long evolved in custom and theory and which is being but now slowly rationalized—textbooks, syllabi, recitation, lectures, memoriter tests, notebooks, blackboards, laboratories, specialized subject-matter logically organized, individualized study, imaginary contacts with concrete situations—all these will doubtless prove hopelessly inadequate to vocational education under school conditions, even though the persistent character of this mechanism will constantly tend to assert itself. It is doubtful also whether satisfactory precedents for method and organization of vocational education in the common occupations, with their large emphasis on skill, can be obtained from vocational schools preparing for the professions, partly because of the relatively academic character of professional education and partly because of the unusual type of mind found in the student qualified for and electing to pursue professional study.

The most fundamental problem in vocational education is that which relates to the place in such training of actual participation in the processes of the occupation itself. The older forms of vocational education were based largely on such participation. The boy became a hunter by hunting, a weaver by taking the simpler tasks with his master, a tiller of the soil by gradually absorbing knowledge and evolving skill as a co-worker with father or employer. But we now clearly recognize that certain forms of vocational power and flexibility are acquired with difficulty, if at all, under an apprenticeship system resting largely on the psychological foundations of imitation and suggestion. These limitations are more acutely felt in proportion as, on the one hand, industry becomes departmentalized, and, on the other, as art and science become more purposefully applied. Herein is found the second large

problem of vocational education. The workshop alone may give the prospective machinist skill in tool manipulation, but it cannot give in any effective way the mastery of drawing, of mechanics, of mathematics, of industrial economics and of industrial hygiene, without which he has but limited capacity for growth or for playing any satisfactory rôle as citizen and master of his own destinies. The ordinary farm as an educational institution can give little of the science which the modern world places at the disposal of the properly-taught tiller of the soil.

In fact, in nearly all vocations there may be distinguished two types of elements, namely, skill and other products of direct experience in the occupation itself, and certain types of knowledge, ideal, and power having form and content outside the occupation, but capable of application to it. The student of stenography learns English only to a slight degree in the study of stenography, but good English is essential to that calling and must be acquired previous to, simultaneously with or subsequent to the acquisition of skill in stenography. The carpenter needs drawing and certain forms of mathematics in his craft; the cabinetmaker needs design; the homemaker various forms of science, such as bacteriology and chemistry, to say nothing of applied art; and the farmer needs economics, soil physics and bookkeeping as tools of his calling.

Now, since it would appear that the intellectually prehensile powers of the youthful mind are great and active, it is natural for an unreflecting pedagogy to seek the mastery of these more intellectual elements of vocational efficiency in advance of the youth's entry on the serious and more direct pursuit of his calling. Is drawing a useful tool to the mechanic, the weaver, the commercial traveler, and even to the farmer and the homemaker? Teach drawing, then, to youth in advance of his being summoned to the practical school of apprenticeship. Should the modern contributions of bacteriology be at the disposal of the farmer, the nurse, the food packer and the housewife? Teach bacteriology in the schools, say educational theorists, and thereby accomplish an important part of vocational training.

This method of approach, indeed, has been largely charac-



teristic of those higher forms of vocational education called professional. The prospective engineer is first drilled in general mathematics, drawing and other more or less logically organized fields of special knowledge and, occasionally, skill. The prospective medical practitioner first gives his attention to general chemistry, biology and physiology. The teacher's first year in the normal school is given to psychology, history of education and other "basal" subjects.

It is not certain, of course, that even in professional education the above pedagogic order is the most effective. It may only be the one most available under existing conditions in professional schools and of educational tradition. Even now we see legal education substituting the "case method" for the dreary introductions through Blackstone and other purveyors of "fundamental principles." Dissecting-room, clinic and hospital apprenticeship seem to play a larger part than formerly in legitimate medical education, and a metropolitan university now proposes to make actual service in water and milk analysis and other municipal activities in sanitation a recognized part of the training of those who are later to practice the arts of healing and of disease prevention. Laboratory, workshop and summer camp are being more extensively employed in training engineers, and it would appear that, barring here and there a defender of the old order, the professors in engineering colleges are attaching less importance, relatively, to the extensive preliminary study by their students of pure mathematics, pure science, etc.

But whatever the case in professional education, there can be little question as to the futility, in the vocational education of youths from 13 to 19 years of age for the common occupations of life, of a pedagogy based on an initial mastery of the more intellectual elements of vocation. Experience has already revealed many impediments to the process. Neither motive nor ability, as found in such youths, is sufficient to enable them to master the fundamentals in science and art preliminary to the application of these in vocation. Professional students, as a rule, belong to an intellectually select class, distinguished largely by its capacity for abstract thinking and constructive imagination. Every step in the boy's "running the gauntlet"

from the primary school to the doors of the professional school is designed to discover and promote these qualities. But the typical worker in the wage-earning callings is distinguished by his "concreteness" of mind. Skill in execution, not grasp of principles, is the demand made upon him by his nature, his surroundings and the idealism of his calling. He can utilize, not the principal contributions of the sciences and arts, but important sections and suggestions, here and there, from them. The loom fixer, the machinist, the farmer, the bookkeeper and the chainman are greatly in need of certain specific helps from mathematics. Neither time, capacity nor inclination permit them to seek their necessary needles in the haystack of general mathematics; they desire to leave the winnowing process to specialists (perhaps schoolmasters) with time and capacity for that sort of work. The farmer cannot be meteorologist, chemist and biologist, but he needs certain "derivative products" from those sciences badly, and he claims that his vocational education should put him in possession of them. In the great majority of every-day vocations, taking account of the qualities of those who are to follow them, the system of providing in advance the "intellectual" as contrasted with the "experiential" elements seems destined to failure. Some educators of shrewd insight suspect that this may also prove true in "general" or "liberal" education also; but, whatever the event may show in that field, we are now compelled to assume that effective vocational education requires a pedagogy in which the results of practical experience in a calling shall be closely interrelated with processes designed to procure sufficient grasp of the more intellectual elements. This constitutes the basis of the several large problems of an educational psychology of vocational education.

Vocational education must either provide or intimately relate itself to the acquisition of practical experience, and it must discover ways of adding thereto the more intellectual elements without relying on the logical organization and external and detached character of the subjects making these contributions.

Theoretically considered from the standpoints both of economy and of efficiency, it would seem that the most promising

method of organizing true vocational education would be to allow the workshop, the farm, the commercial establishment and the household to continue their historic educational function, viz., that of providing by actual work under normal conditions of employment the "experiential" basis, the vocational school, so-called, coming in to supplement with the appropriate "intellectual" elements. This arrangement, indeed, is that contemplated by the so-called "part-time" or "continuation" type of vocational training. The vocational evening school also exemplifies the application of this principle to the needs of more mature students. In practice, the weakness of joint or "co-operative" programs of vocational education of this sort is their lack of integration. The practical experience acquired in the workshop—here used as a general term for any place where actual experience in productive work is had under conditions commercially characteristic of the occupation—is likely to be specialized and without educational sequence or organization. The school work is prone to develop a theoretic organization, with the result that its returns in knowledge, specialized skill, etc., may be more or less permanently placed in mental cold storage. Much evening instruction is of this "non-functioning" character; only the rare student can bridge the gap and carry his freightage of theory into application.

Even when we shall have reached a full social realization of the law that the plastic years of youth should be at least partly reserved for learning, and when employers and teachers shall have learned to co-operate in providing that work shall be made to contribute its best educational results, it may prove necessary in certain vocational fields to bring a workshop into the school in order to obtain a proper integration of practical and theoretic elements in vocational training. In the making of the stenographer, for example, this is now done, because commercial "shop" conditions cannot tolerate the mere learner. In a hundred other directions this may also prove to be the case.

We shall have to turn eventually to educational psychology to assist us in organizing this practical work so as to get a working resultant between standards of skill, on the one hand,

and extent of ground to be covered, on the other. How long shall the machinist use one tool in a single type of operation? Until he has skill and speed equal to the commercial demand, or only until he has a sufficient basis of experience to enable him to grasp the related supplemental studies and to start "right" in his later shop work? Only a scientific study of the problem by educators appreciative of the meaning of "industrial efficiency in the long run" can tell. In the meantime, without prejudice to what educational psychology and commercial demand may eventually prove to be the valid method, it is the privilege, if not the duty, of vocational teachers and of employers to continue to guess to the best of their ability.

But a still more serious problem for educational psychology is to be found in the "method" of organizing and presenting the more intellectual elements of the various vocations to young learners. Ages of experience in apprenticeship should have given us many clues to the organization of the practical side of the student's program. Schools of liberal education have long established logical orders of organization in the theoretic fields of the sciences, arts and histories upon which vocational education must draw. But, as already indicated, experience shows that we cannot utilize these organized fields as such in the training of the rank and file of workers. Few, if any, precedents yet exist for the organization of programs of study and practice in the more intellectual phases of vocational training. Tell a machine-shop instructor not to require of his pupils a systematic course in mechanical drawing, but to base a series of drawing lessons on the practical work which his pupils are doing from day to day, and he complains that they "must first learn the principles." Tell a normal-school teacher that the best psychology of education, at least for normal-school young women, should probably grow out of and be built upon their daily problems of teaching; and he or she, too, will raise embarrassing questions as to terminology and "general principles," and will conclude by asking if any authoritative textbook exemplifies the "new method." Ask a teacher in an agricultural school whose boys may be doing very practical, and even scientific work (the result of suggestion), in growing corn and raising poultry to forego the teach-

ing of systematic chemistry, botany, physics, bacteriology, etc., in favor of "agricultural science," and he will look dazed, and will forlornly and helplessly set to work to do as he is asked. We are asking these teachers to construct a new type of pedagogical material. Except in the primary school, educational psychology hardly furnishes even the help of analogical situations. Nevertheless, in the vocational school claiming to be effective we must fight persistently for a new pedagogic organization of subject-matter wherein practice must form the groundwork and point of departure for the more theoretic studies. Ideally, we are seeking a program wherein concrete and vital experience, gradually interpreted and illuminated into a unity of skill and comprehension of principles in their application to the calling, shall be the outcome of vocational education. We dare not in genuine vocational education content ourselves, on the practical side of such training, with the fool's paradise of imitation and sham participation in the real work of life, such as the manual-training exercises, the sprouting of a few seeds, the embroidering of doilies, the making of pastries and the amateurish dabbling with typewriting and bookkeeping, nor shall we find in systematized mathematics, drawing, chemistry, economics and kindred subjects the forms of organization and methods of presentation adapted to the need of our pupils. We are face to face with a department of education, largely a new development, wherein we have no more science to guide us than in other departments and vastly less of tradition.

Perhaps it is to be hoped that because we have a paucity of tradition progress will come the sooner. If we could persuade a few investigators to take this as their field, that might be the case. Unfortunately, the harried teachers in the vocational schools can give little time to constructive programs, although it is hard to see how they can succeed in their work until they do. The administrative authorities of such schools have their problems in forcing a place for the practical work and in preventing a relapse into the stereotyped pedagogical methods evolved in the ages of bookish secondary education—an education which has rarely discovered, much less studied, the learner, but the votaries of which, like Hindoo mystics, contem-

plative of their bodies, have focused their attention on subject-matter until self-hypnotization has rendered them oblivious to the world of external actualities.

We may summarize, then, as follows:

1. Vocational education is a distinctive type of education, especially when promoted under school conditions. It will present its distinctive problems to the educational psychologist.

2. Present experience seems to demonstrate that a large—perhaps major—place must be given in vocational education to productive work, by graduated stages, in the occupation itself. Historic experience may assist in shaping the programs of this work, but ultimately careful experimental studies of the processes by which skill—flexible and capable of growth—may be developed must be made.

3. Skill and other products of direct experiential contact with vocational situations constitute a considerable part of a complete vocational education, but a no less important part will be found in the knowledge, auxiliary forms of skill and ideals which function in the larger, more flexible and more prolonged vocational efficiency. For education in these latter elements in the case of youths of 13 to 18 years of age existing pedagogic processes, whether scientific or customary, offer as yet little assistance. This is peculiarly a field for constructive effort.

## THE BEARING OF HEREDITY UPON EDUCATIONAL PROBLEMS.

HENRY H. GODDARD, PH.D.,  
Vineland, N. J.

It is often stated that, were the prince and the pauper or the thief to be interchanged at the hour of birth, each would develop to an appropriate *protégée* of its foster parents; or, in other words, that education and environment are the essential factors in the development of the human organism. Those who make this assertion do not deny that heredity plays a part, but rather assume that its function ends when it has produced a human being as the offspring of a human being, and that individual peculiarities and differences are not inherited at all, but are wholly the result of environment.

It is often easy to point out a child or young man with peculiar attributes which are directly the result of his environment. On the other hand, does not every teacher find himself compelled to admit that there are children who develop along certain lines, or who fail to develop along other lines, despite the best training and the best environment? Then we fall back upon the conclusion that here we have to do with heredity, and that no efforts of ours can alter the result.

Not only is this true, but the recent researches of Pearson in London and of Davenport of Cold Spring Harbor show conclusively that a great many things are inherited which we have not usually recognized—things which must be recognized and reckoned with if we are to save our energies and treat wisely those under our care.

Perhaps the best illustration, although necessarily extreme, can be taken from the realm of mental defectives, with which the writer is most familiar. Feeble-mindedness is hereditary in 65 per cent. of the cases. Whether there is any difference

in the "trainability" of the child who has inherited feeble-mindedness and that of the child who has acquired it we cannot say as yet, but it certainly is true that it is of great importance to anyone who has to deal with such a child to be cognizant of the hereditary factor if it be present. This is particularly true of those high-grade cases which are not often recognized save by the expert and who look so much like normal children that it is a temptation to waste a great deal of time upon them in trying to make them develop along normal lines and do those things for which they have not the brain or mind.

As things are now, we generally keep on year after year in our endeavor to train these children, and only after their school work is passed do we discover that they are feeble-minded and that it was not possible for them to learn what we were trying to teach them. Then we know that, had we taught them the things they could do, we might have trained them to partial usefulness. But what is readily seen to be true in this extreme case is equally true in principle of all children, and could we but know the ancestral tendency of the children in our public schools, we would have one very helpful guide toward the direction in which the child's mind could be most easily and successfully developed.

The collection of such family histories is, as a rule, not difficult. Even when it is somewhat difficult, a little tact on the part of the teacher will usually resolve the difficulty. Every family of good ancestry is delighted to recount the main features of the family history, including all evidences of mental ability, and even some of the weaknesses. One is not afraid to speak of one's weaknesses if one has some excellencies to counterbalance them. So it is entirely possible to get a beautifully full history of such families as these. If necessary, these histories can be corroborated by impartial and disinterested persons.

In the case of the less favored children, it is, again, not difficult to get most of the essential facts. A few carefully-worded questions as to the physical condition, the occupation, etc., of the various relatives is usually sufficient to afford an adequate indication of the mental condition and tendencies of the various members of the family. Having these data, through what-

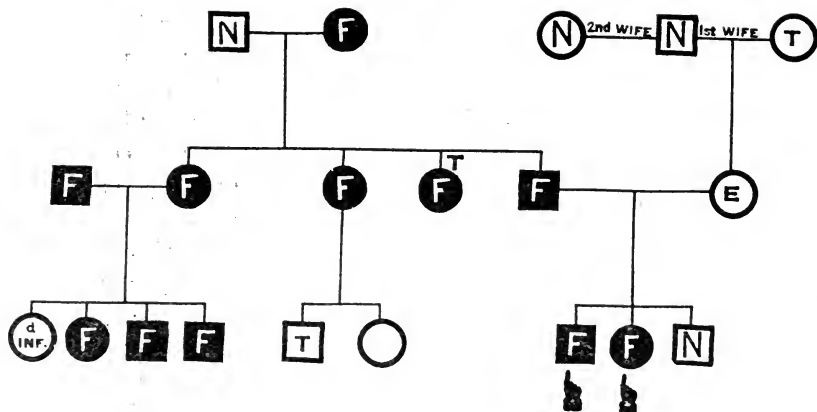


ever source they may come—either directly from the family or by careful investigation from others who know the family, even including the family physician or any others in the neighborhood—it is worth while to arrange the information where it may be quickly available. There is, perhaps, nothing less interesting than a page of letter-type relating the bare facts in regard to a family. Even the family tree is not of great interest to anyone outside of the family concerned.

But there are methods of representing the family histories graphically which exhibit the matter at a single glance and in a way that is actually fascinating. We have been studying this problem at Vineland for a year and a half, and have developed what is proving to be a very satisfactory method of recording our data graphically. This method has recently been elaborated in conjunction with several institutions which have adopted it, and is completed by an account of the method of collecting the data, charting and studying it. This has been issued by the Eugenics Record Office at Cold Spring Harbor, Dr. C. B. Davenport, director. Two charts are shown here to illustrate the method of recording data and to show how graphic and impressive hereditary relations may be made.

Chart I is a comparatively simple family history. It did not take long to get these facts, yet see what they tell us about these two children, both of whom are at the Training School at Vineland. The boy, who is feeble-minded, is quite high grade—a typical school case. He is the kind of boy that any school teacher would struggle with; that would lead this teacher to feel that if she worked a little harder, sat up a little later nights, stayed a little longer after school, talked with him at recess, and so on, using all of those methods which the conscientious teacher is constantly trying to use on her children, she could bring him up to normal and make a good citizen out of him. But what is the history of the family as shown on this chart? The mother is epileptic. Her father was a normal man and the wife was tuberculous. So far there is nothing more serious than the mother's epilepsy, which, perhaps, is only accessory, as she herself is rather dull and slow. The father, however, is feeble-minded. He had a feeble-minded sister who died of tuberculosis; another feeble-minded sister

CHART I



## EXPLANATION OF SYMBOLS.

Square represents males.

Circle represents females.

Square or circle with nothing in it means conditions undetermined.

The white *F*, on black background means a feeble-minded individual.

*d. inf.* means died in infancy.

*N.* inside the square or circle means that the person was normal.

All persons on the same horizontal line belong to the same generation.

Those dependent from the same horizontal line are brothers and sisters.

A vertical line leads up to the line connecting the parents of the group.

*T.* Tuberculous.

*E.* Epileptic.

*A.* Alcoholic.

The index hand points to the child or children in the Training School at Vineland, N. J.

who married and who had two children, of whom nothing is known except that the boy has tuberculosis. Another sister of the father is feeble-minded and married to a feeble-minded man. They had four children, one of whom died in infancy,

and the others are feeble-minded. As to the paternal grandparents of our children, the man was normal, but his wife was feeble-minded. With such a history it certainly would make any teacher feel that there was a limit to the efforts that she was called upon to make in her desire to develop normal efficiency in this child.

CHART II

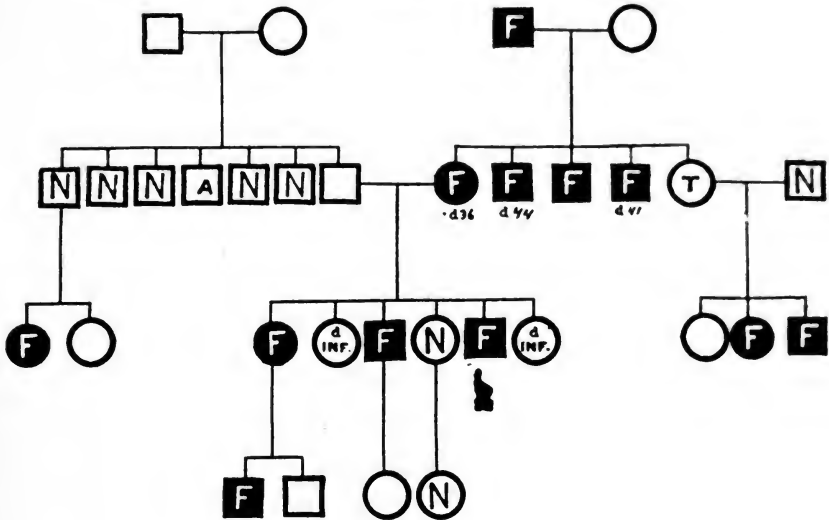


Chart II. The second child is even more striking. The boy to whom the hand points has left Vineland. He is one of those very bright inmates of an institution for the feeble-minded who is very carefully watched by those in authority, lest perchance he be normal and be unjustly treated by being kept in an institution. In this particular case he was kept in the institution until finally the time came when it seemed that it was wise to let him actually try his hand at making his own living in the world. He has been away now for some time, and his history reads something like this: He worked for one man for a time, and finally left without any wages because the man told him that he was a little short of money, but would pay him some time. He has never paid him. He worked for another man who understood his condition and who had a good deal of sym-

pathy for him and who did everything possible, but could not train him to do anything that was satisfactory. The boy was forever talking in ways that interfered with the man's business. He was continually acting in a foolish manner with regard to young ladies, and in one way and another he was plainly a nuisance and the man had to dismiss him. So he has gone from one place to another. Either he does not earn much, or, if he does have wages promised him, he is cheated out of them when payday comes. In short, his actual career in the world proves that he is unable to take care of himself—unable to compete with normal boys in the struggle of life.

Now, let us see what might have been predicted of this boy from his family history as shown in the chart. It will be noted that there is one normal sister. The rest are either feeble-minded or died in infancy. The feeble-minded sister has married and has two children, of whom one at least is feeble-minded. The father's mental status is undetermined; he has several brothers, however, who were normal and one who was alcoholic. But of the mother's family we know enough to solve our problem. The mother is feeble-minded; she had three feeble-minded brothers. Another sister had two feeble-minded children and one that is undetermined. Going back to the third generation, the maternal grandfather of our boy was also feeble-minded; the grandmother is undetermined. In the family, then, of this boy, who is relatively so bright that it was a question whether he might not pass for normal, there are found twelve feeble-minded persons, along with several others whose mental condition has so far not been determined.

Charts similar to these could be made for every child in the school, and with sufficient detail—with matters recorded that experience will prove useful—these would enable us to predict with surprising certainty what is to be expected of the children whose ancestry they depict. It may be objected that such charts would prejudice the teacher, that efforts would not be made where efforts ought to be made. This is a bogie which does not exist. As a matter of fact, regardless of the charts, every person concerned will still make every possible effort. The point is that, knowing the facts of the family history, the teacher is able to interpret the results as they are found and

understand how to take the next step in the training or development of the person under consideration.

And so we can conclude that, even if in some cases the prince and the pauper do become proper scions of their adopted parents, nevertheless a knowledge of the true ancestry would enable us to understand some of the princely acts in the adopted son of the pauper, and *vice versa*. With the many unknown quantities involved in the problem that the teacher has to solve in the grading of every child in her care, there is no reason why a valuable source of help should be neglected. There seems to be no good reason why the pedagogue should neglect to inquire into the ancestry of his pupils.

## MENTAL DEVELOPMENT AND THE MEASUREMENT OF THE LEVEL OF INTELLIGENCE.<sup>1</sup>

SANTE DE SANCTIS.

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Some mental processes, as sense perception, imagination, and memory, are "immediate," and behave according to the laws of association. Such immediate mental processes are not merely psychological "constructs," but become genuine centers of mental force whenever they are animated by voluntary attention. To these processes the inclusive name of *lower ideation* may be applied, and to this class belongs, I believe, what is called *empirical*, or *associative*, or *reproductive* thought. The empirical thinker derives his judgments from the data which he cognizes directly in himself, and from the way in which these data behave with reference to their associates. (James.) Here one is reminded of Loeb's "associative memory."

But there are "mediate" or higher mental processes, which correspond to what was formerly called reflective thought, and these we may include under the term *higher ideation*. Intelligence, properly so called, or intellectual capacity, is a manifestation of higher ideation, and consists of further elaborations of the immediate mental processes which characterize lower ideation. Let us not place an insurmountable barrier between lower ideation and intelligence. There is no discontinuity between them, but rather a progressive evolution.

Higher ideation is a complex of representative processes constituting the last stage of mental development; but even in children of eight to ten years of age this stage is noticeable. This we can readily understand when we remember the pro-

<sup>1</sup>Résumé of two lectures delivered in connection with a course in experimental psychology at the University of Rome, 1910-1911.

[Translated from the author's manuscript by J. C. B.]

gressive development of the "neo-encephalon" (to use Edinger's term) in the species, and the increasing complexity of the structure and connections of the cerebral cortex during the growth of the individual. For experimental psychology the hypothesis or doctrine that permits the appearance in man of new metaphysical entities is superfluous and even dangerous.

Under higher ideation we include judgment (which precedes the concept according to many modern psychologists and logicians), the formation of concepts, and reasoning,—all involving abstraction and generalization. Instead of reasoning, many use the term "sense of reality," but in point of fact this is somewhat different from reasoning, and is not a purely intellectual product, but has a greater resemblance to belief. There are insane patients who are able to judge, conceive, and reason, but who have lost the sense of reality, and we psychiatrists say they are lacking in critical faculty.

With these preliminary considerations experimental psychology can proceed to the great problem of the measurement of intelligence. The expression, measurement of intelligence, is not the most desirable; it would perhaps be better to speak of experimental tests of intellectual capacity or higher ideation, or, still better, *measurements of the level of intelligence*. The task is by no means an easy one. At one time it was thought that such measurements could be derived from the physical examination of the subject, that is, from physiological and morphological measurements, especially from cephalometry. The principle was correct, for necessary correlations exist between the organ and the function, between the mental and the physiological. For example, at the moment when the cranium has ceased its growth, the lowest limit compatible with a medium intelligence is a maximum cephalic circumference of about 51 centimeters. It is probable that adults whose heads measure less than 52 centimeters in circumference will possess none of the higher mental capacities; for in that case the cranium will probably be under 1200 cubic centimeters in volume, and the brain will weigh less than 1200 grams. (Bayerthal, 1909.) Thus in children seven years of age whose greatest head circumference is less than 47 (females) or 48 (males)

centimeters, a normal development of mental capacities is impossible. But these considerations have a very limited application in practice. If correlations actually exist, we do not know enough about them to determine their exact nature. On this account the direct method of measurement, or the psychological method, is preferable.

Here we must note an important fact. Many have tried and are still trying to measure the intellectual level in adults by testing elementary psychic states, *i. e.*, sensations, or by testing attention or memory. This may seem justified on the principle of psychic correlation, but after my remark about higher ideation it seems evident that the principle is scarcely applicable here. Moreover, it is difficult to understand how one pretends to test the level of intelligence in children, in whom, as I have pointed out, higher ideation is not yet developed. In order to test the intelligence of children it is necessary, then, to put one's faith in the principle of psychic correlations. Assuming this principle one can legitimately take as the measure of the intellectual level the measure of attention or of memory. The desired goal is not always reached, it is true, by this indirect measure, but the value of the method is attested by many observations. For example, one of my pupils, Signorina Ieronutti, has recently discovered that the children who are considered most intelligent in school use the "whole method" spontaneously in their memorizing. In this case, then, the manner of memorizing might be used as an index of the child's intellectual level. I consider as good methods for the direct measure of the intellectual level the "combination" or completion method of Ebbinghaus, and Binet's description of an object. In practice, however, they offer many difficulties, especially the latter, although it is perhaps the best method now in use for the discovery of mental types. I have often recommended Toulouse's syllogisms as a test, but one must be careful not to confuse capacity for syllogizing with capacity for reasoning. Not only does syllogizing imply something mechanical, a mental habit, but it seems preferable to adopt tests of reasoning which proceed from the particular to the general.

Here permit me to digress. Formerly it was customary to



recommend exercises for thought training, but today such exercises are falling into disrepute. What shall we say of this? In my opinion the discussions on this point have not yet reached a satisfactory conclusion. Experimental psychology has not offered any serious contribution to the question whether practice in reasoning favors the development of a general capacity for reasoning. This is a problem for the future. At the present time in our laboratory Signorina Ciancio is investigating precisely this interesting question.

There are several methods of measuring the level of intelligence:

1. *A list of questions of increasing difficulty.* This is a good general psychological method, and I have used it with great success on mental defectives ten years old and over. If we have forty questions of progressive difficulty, some subjects can master the first ten, others get as far as the first thirty-five, and a small minority can answer all forty. In this way the level of intelligence can be graded.

If we divide these forty questions into four groups of ten questions each, we may form a scale, by the application of which we obtain a classification of our subjects according to four degrees of level. If, now, we select not forty, but one hundred questions of increasing difficulty, and divide these into ten groups of ten questions each, we have at our disposal a means of classifying the subjects according to the level of their intelligence into ten different grades. By applying this principle of questions of progressive difficulty, Binet and Simon constructed their

2. *Metric scale of intelligence.* This scale, however, does not merely offer tests of increasing difficulty, but presupposes a further principle, viz., that every stage of the scale corresponds to the intellectual development characteristic of a given age. This is one of the theoretical assumptions of the Binet-Simon scale. But before we could judge of the applicability of the metric scale it would be necessary to determine whether this principle is well grounded. Binet and Simon made an inventory of the intellectual capacity of several children of different ages, and were thus able to begin with a foundation of fact. So it may be said that the metric scale had

an experimental basis. Nevertheless, it would not be amiss to verify it again by examining several hundred boys and girls of all ages and of different nationalities, as Italian, American, German, etc.

However such an examination might result, it behooves us to consider some questions relative to mental development during the period of growth. Man is not born an adult, as are some lower animals; he is born with the *tendency* to develop. The infant is born without experiences and adaptations, but his inherited tendencies force him to acquire his store of knowledge little by little. It is certain that the infant's existence is characterized by such tendencies in constant operation. The child is not a miniature adult. He is a specific being because he is perpetually becoming, and some of the most important manifestations of this development are seen in play and imitation.

The believers in free will say that it is spontaneity that determines psychic development; the child is said to develop by internal spontaneity modifying its environment. We cannot accept this view, as we attach great weight to the stimuli of the environment. For biology so-called spontaneity is nothing but inborn tendency, and this is explained by the laws of heredity. Just as incessant stimuli determine the development of the nervous system (Ramon y Cajal), so incessant experience determines the psychic development of the infant and the child.

When experience and adaptation have reached a considerable degree of maturity, all that complex of processes which we call *will* become possible for the child, and the organism, which up to that time seemed passive with reference to the environment, now appears to us as active and willing. It is true that mental development gradually progresses from less to more, but it is not equally true that it proceeds from the simple to the complex. First the infant has what we may call intuition, then it observes persons and things, and later, assisted by the development of language, it discovers relations and recognizes the qualities of objects. Thus one may say that mental development proceeds from the indistinct to the distinct, from the passive to the active, or, as it is usually called, will. The

original intuition, however, never entirely disappears, is never exhausted; the adult always remains in large part an infant, with the added characteristic that in certain moments he is aware of the need, we might say, of infantile intuition, as though clear and distinct consciousness were not enough for him.

Is there a parallelism between physical and mental development? We firmly believe that, at least in the living organism, the destiny of the spirit is linked with that of the body. It is true that there are authors who deny such a parallelism. I believe that the parallelism exists, but on account of the little that we know of the subject the correspondence is not always apparent. At least it does not seem evident in the development of particular mental functions, such as memory, suggestibility, etc. The laws of physiological, psychological and psycho-physical correlations dominate growth, and yet exact parallelism cannot be demonstrated; rather the correlations vary enormously from individual to individual, and the laws of correlation are probably far from general.

From this brief discussion we may conclude that it is not an easy undertaking to establish a definite relation between age and the degree of mental development, particularly if one desires to abstract from the degree of instruction, that is, the number and quality of scholastic attainments and the acquisitions of practical life. But granting all this, I believe that the application of the metric scale to determine whether a child's intellectual level corresponds to its age gives good results.

The greatest defects of the metric scale appear, as many others have pointed out, when we come to apply it to idiots, imbeciles and demented. Empirically I have found that the scale, which works well with slightly atypical children, proves less satisfactory with imbeciles and idiots, and is almost worthless for demented. One can easily understand such a failure, since the application of the scale in these cases would imply that the degrees of intellectual defect in idiots or in demented correspond to the degrees of intellectual development in ages of growth. It would assume that the laws of intellectual regression and involution are the same as those of progression and evolution. This is yet to be proven; rather we

have good reason to believe that it is not true for all idiots and imbeciles, and that it is still farther from the truth with demented. Illness rarely produces retardation, arrest, or destruction of the intelligence as a whole. And in any case how can we assume so lightly that psychic correlations maintain their rhythm in intellectual decay?

The metric scale can be applied with undoubted success to cases of infantile mentality,—to those cases, that is, which we physicians group together under the name of *infantilism*. This is what we should expect. Here the mental retardation or arrest is almost always regular and the intellectual level actually resembles that of normal children or adolescents.

I have said that the Binet-Simon metric scale gives good results with normal and somewhat atypical children. But even here, on the basis of experimental investigations, I ought to make some reservations. In Italy, Signorina Ieronutti was the first to apply the metric scale to normal and abnormal children in my laboratory, and she made the first criticisms of it. Later it was criticised by Treves. The application of it by Decroly and Degand gave better results than ours. In certain American schools the scale is now accepted without question and is currently applied, for example, in Vineland, New Jersey, and seems to give extraordinarily favorable results. (Goddard.) While this may be true, it is noteworthy that Binet in recently republishing the scale has taken account of the many criticisms made of it, including those of Signorina Ieronutti, and I have already found that the scale thus corrected is more serviceable with subjects ten years old and over.

At the present time in certain American, Russian, and Italian institutions my series of tests of 1905 are in general use. These tests, however, are not designed primarily to measure the level of intelligence. Rather I intended them to measure the degree of mental defect. By the application of my tests in an institution for idiots or in a special school for abnormal children one can easily and with a high degree of certainty obtain a division of all the inmates into three groups, mental defectives of the third, second and first grade. Thus, those who are called idiots and imbeciles (defectives of the third and second

grades) are quickly distinguished from those who are today called "morons," defectives of the first grade. This is important from the medico-pedagogical standpoint, since the morons should be sent to special schools, or as day pupils to asylum schools, while the idiots and imbeciles should be entrusted to institutions. For those who are not familiar with the De Sanctis tests it will perhaps be well for me to outline them in order that others may employ them in practice.

### THE DE SANCTIS TESTS FOR THE MEASUREMENT OF MENTAL DEFICIENCY.<sup>2</sup>

I. *Give me a ball.* (Present five balls, each of a different color. Note the time of response. As soon as this is given, even by a simple gesture, drop the screen between the experimenter and the subject.)

II. *Which is the ball you just gave me?* (Show the same five balls arranged in a row. Note the time of response, and as soon as there is a sign of recognition drop the screen.)

III. *Do you see this block of wood?* (Show a wooden cube such as is used in the kindergarten.) *Pick out all the blocks like this from the pile on the table.* (Show five cubes mixed with three cones and two parallelopipeds. Note the time required for selecting and arranging the cubes, and replace the screen.)

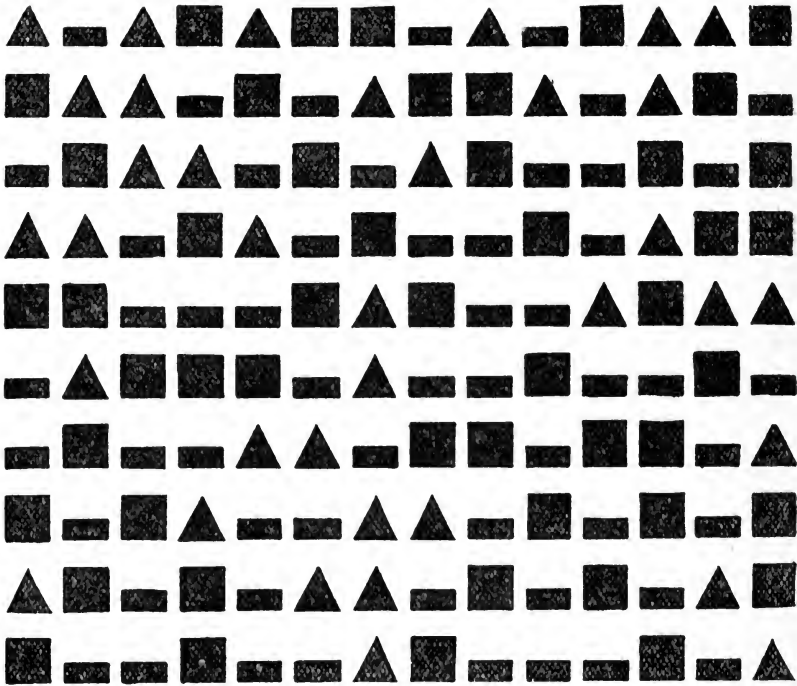
IV. *Do you see this block?* (Show a cube.) *Point out a figure on the form chart that looks like it.* (Show the form chart, and note the figure to which the subject points. If he points to one of the small squares, proceed as follows:) *Take this pencil (or pointer) and point out all the squares on the chart as fast as possible without missing any, taking the fig-*

<sup>2</sup>These tests are the ones proposed by S. DE SANCTIS: *Types and Degrees of Mental Deficiency*. Annali di Nevrologia, Naples, 1906. It should be understood that the experimenter may always substitute for the words suggested other words better adapted to the age and the degree of instruction of the subject. This was the procedure of Professor M. Montessori, and more recently of A. Ieronutti. Cf. The article of A. Ieronutti, Rivista Pedagogica, Year 3, No. 3, Rome, 1909.

[A description and discussion of these tests will be found in Whipple's Manual of Mental and Physical Tests. Baltimore: Warwick & York, Inc., 1910. Pp. 469-473. Eps.]

ures line by line. (Note the time, the mistakes and omissions, and drop the screen as soon as the subject has finished.)

V. *Here are some more blocks like those you have pointed out on the chart.* (Spread the blocks out on the table in such a manner that the distance between the cubes is not more than



DE SANCTIC FORM-TEST.

About one-quarter actual size.

two centimeters. Each cube should be just one-half centimeter longer on each side than the next smaller one. To make the test more difficult one may (a) increase the number of cubes scattered on the table or (b) decrease the differences in size.) *Look at them carefully and tell me 1. How many there are. 2. Which is the largest? 3. Which is the farthest away from*

you? (Note the time, the errors, and the omissions, and replace the screen as soon as the questions are answered.)

VI. *Do large objects weigh more or less than small objects? Why does a small object sometimes weigh more than a large one?* (The second question is put if the first has been answered correctly.) *Do distant objects appear larger or smaller than near objects? Do they only seem smaller or are they really smaller?* (This question will show whether the subject is aware of optical illusions.)

*Determination of the degree of mental deficiency in accordance with the tests.*

1. If the subject does not pass the second test the mental deficiency may be considered of a high grade.

2. If the subject cannot go beyond the fourth test, or if he makes many mistakes or is very uncertain in the fifth, the mental deficiency may be considered of a medium grade.

3. If the subject succeeds in five tests but finds the sixth difficult, the mental deficiency may be considered of slight amount.

4. Finally, if the sixth test is completed without mistake, the subject may be said to present no mental deficiency.

#### MATERIAL REQUIRED FOR THE DE SANCTIS TESTS.

(1) A table, in the center of which is placed (2) a screen consisting preferably of a wooden frame about 40 centimeters square, filled with a white cloth, which is attached only at the top. (3) Five glass balls, each of a different color. (4) Twelve wooden cubes of the same color but gradually increasing in size. (5) Three wooden cones, all of the same size, and of the same color as the cubes. (6) Two equal wooden parallelepipeds, of the same color as the cubes and cones. (7) A card-board chart on which are reproduced in black 36 triangles, 55 rectangles, and 49 squares. The chart measures 40 by 30 centimeters, and the figures are arranged in ten lines of fourteen figures each. (8) A stop-watch measuring fifths of a second.

## ABSTRACTS AND REVIEWS.

J. ARTHUR THOMSON, M.A. *Heredity*. New York: G. P. Putnam's Sons. London: John Murray, 1909. Pp. ix, 605. \$3.50.

W. BATESON, M.A., F.R.S., V.M.H. *Mendel's Principles of Heredity*. Cambridge: At the University Press. New York: G. P. Putnam's Sons, 1909. Pp. xiv, 396. \$3.50.

In these two books one gets a fresh, comprehensive and accurate survey of heredity, supplemented by the most elaborate contribution to its most important recent phase, Mendelism. No better books have been published in recent years for the teacher or student who desires to get in touch with current biological work. Thomson's treatment of heredity is broad enough to include the microscopic study of the germ cells, the experiments in breeding and the results of the statistical method. A feature of the book is a bibliography of 58 pages, classified by author and by subject.

The position of the author is indicated by his acceptance of De Vries' origin by mutation without going to the extreme of regarding it as the sole method of origin; his cautious recognition of Medelian principles to explain part, but not all, of inheritance, and his desire to harmonize these results with the conclusions of the statistical school. His whole-hearted acceptance of Weismann, who, he considers, has done as much for heredity as Dalton did for chemistry, is accompanied by an extended and considerate attention to other conceptions that give an impression of conservative fairness which is imperative in a writer who attempts to summarize so broad a field.

The analysis of the problem of the transmission of acquired characters, or modifications, as he terms them, and the review of the evidence for and against this conception, is probably the most elaborate to be found anywhere. It occupies 86 pages, nearly a fifth of the book. The discussion is very keen and clarifies the problem from nine specific misunderstandings.

Thomson's final chapter on the relation of biological conclusions to social questions is a suggestive essay in which the author shows



his broad views. He recognizes at once that society is as far beyond biological analysis as life processes are beyond mechanical analysis. He, therefore, protests against those who would make "the human societary group no more than a crowd of mammals." On the other hand, he believes that "the biological ideal of a healthful, self-sustaining, evolving human breed is as *fundamental* as the social ideal of a harmoniously integrated society is *supreme*." The bearing of heredity, variation and modification upon social problems, especially upon eugenics, is briefly stated. There is also a section on the directive factors of selection and isolation. He accepts Pearson's conclusion that family correlations in physical and mental traits are the same in amount, which seems to be quite doubtful. The inheritance of mental characteristics, he observes, places one in a better position to understand "social solidarity" and "social inertia." He notes that just as Galton's *Hereditary Genius* affords "a biological basis for pride of race and a respect for true aristocracy, so his filial regression formula is a message to democracy." He suggests that Mendelism be tested among Eurasians, where, if true, a sifting of pure Asiatic and pure European characters should be found. In general, this discussion is brief but thoughtful. It does not attempt to be exhaustive, and should be supplemented for those interested in mental inheritance by Thorndike's chapters in the new edition of his "Educational Psychology." Militarism receives a thrust as a social force working toward the elimination of the fit, and tending, as in the history of Rome, to replace "Vir" by a mere "Homo." As to man interfering with natural selection, he says "it were a sad confession of incapacity if man could not select better than bacteria." He agrees that the reproduction of weaklings should be discouraged "in every way compatible with rational social sentiment," which would include marriage examination, segregation of the unfit, and possibly forfeiture of the right to produce for those "obviously unfit who have to fall back on the State for support."

Mendel's "Principles of Heredity" is an entirely different type of book from that of Thomson's. It is not a review so much as a fundamental contribution to genetic science and a foresight of the revision of evolutionary conceptions in the light of the new evidence of the factorial analysis of heredity. Biologists must read Bateson; others will read part of the breeding experiments and then the vital conclu-

sions which set forth a manifest mutation in biological thought with which all students must reckon. The result of Mendelian and mutation evidence "shows immediately to be false," Bateson asserts, "the conception of evolution as proceeding through the gradual transformation of masses of individuals by the accumulation of impalpable changes." As to natural selection, "various plausible, but frequently unsatisfying, suggestions put forward, especially by Wallace, Weismann and their followers, as probable accounts of evolutionary progress, must be finally abandoned." The systematist, the morphologist, the physiologist and the cytologist "must now examine the current conceptions of his study in the light of the new knowledge \* \* \* Those who, as evolutionists or sociologists, are striving for wider views of the past or of the future of living things may, by the use of Mendelian analysis, attain to a new and yet limitless horizon." "Of the so-called investigations of heredity pursued by extensions of Galton's non-analytical method, and promoted by Professor Pearson and the English biometrical school, it is now scarcely necessary to speak. \* \* \* To those who may hereafter study this episode in the history of biological science it will appear inexplicable that work so unsound in construction should have been respectfully received by the scientific world. With the discovery of segregation it became obvious that methods dispensing with the individual analysis of material are useless."

Bateson has certainly grasped the great idea of segregation which Mendel announced in 1865 and which biologists allowed to lie buried until 1900, and he is still militantly setting it forth. The demonstration of segregation of unit characters is certainly basis enough to demand the adoption of Mendelian principles of inheritance in some measure, but one wishes that their champion were not so ready to ram them down the throats of opponents. The reading of Bateson's challenge creates a sympathy for his more conservative admirers, like Thompson, who replies to the Mendelian criticism of the biometrists that "it is simply muddle-headedness which can find any opposition between a statistical formula applicable to averages of successive generations breeding freely and a physiological formula applicable to particular sets of cases where parents with contrasted dominant and recessive characters are crossed and their hybrid offspring inbred."

The Mendelian principles as presented by Bateson are far too com-

plex to allow even a concise statement of them in a review. His own researches carried on with his partner, Dr. Punnett, form the basis for his conclusions, and are set forth in connection with the results of many other investigators in this field, represented by a bibliography of over 300 titles. A biography of Mendel, with three portraits, and the translation of his two papers on hybrids, are included in the book.

The student who is not conducting genetic experiments will be especially grateful to Bateson for his description of the facts in plant and animal heredity already studied and thought to conform to Mendelian analysis, including 61 structural characters and five chapters on the heredity of color. These descriptions are accompanied by six beautiful colored plates and 38 figures.

As to the bearing on the broad problems of biology, he promises another book which shall amplify the Silliman lectures given at Yale in 1907, so that he only hints at his views here.

Two chapters of unusual interest are on Mendelian inheritance in man and on the practical application of Mendel's principles. In man "only a single case has been established with any clearness," namely, that brown eyes (defined as having pigment on the anterior surface of the iris) are dominant over blue eyes. Bateson describes, however, quite a number of characters which the pedigrees thus far available indicate follow Mendelian lines of inheritance. Among those which he presumes are dominant in man are various disturbances of the skin and hair, brachydactyly (a condition in which the fingers and toes have only one joint like the thumb), congenital cataract, enlarged spleen, diabetes insipidus, congenital stationary night blindness, droop of the upper eyelid and some forms of glaucoma. Abnormal characters are usually dominant. Dominance is discovered in man by the character being transmitted only by individuals manifesting it and usually by one-half the progeny tending to show the character. Recessive characters are recognized by appearing in the children of unaffected parents, especially in the case of consanguinous marriages, one-fourth of the children tending to show the character. Among those which he collects from various sources as probably recessive in man are red hair, musical ability, retinitis pigmentosa, albinism and alkaptonuria. Certain sex-limited characters, he believes, may be dominant in the male and recessive in the female.

These include hemophilia (liability to bleed), color-blindness, Gower's disease and some kinds of night blindness. So far at least as mental traits are concerned one should oppose to Bateson's faith in Mendelian heredity Thorndike's criticism in which he contends that "no case is known of a mental trait appearing in three sharply-defined degrees," and, further, that the discontinuity demanded by Mendel's principles seems to be unproved for original traits which the followers of Mendel have suggested, including color-blindness and idiocy.

In the applications to human society Bateson takes a stand in favor of restraint of the unfit and against proposals for the genetic encouragement of the fit, since "we have little to guide us in estimating the qualities for which society has or may have a use."

J. B. MINER.

University of Minnesota.

CHARLES EDWARD WALKER, M.Sc., M.R.C.S., L.R.C.P. *Hereditary Characters and Their Modes of Transmission*. New York: Longmans, Green & Co., 1910. Pp. xii, 239.

We have in this interesting volume a careful, yet untechnical, presentation of the main facts and chief theories of heredity, together with an exposition of the recent discoveries in cytology that bear upon the problems of heredity, and an attempt to work out the theoretical consequences to heredity that flow from these discoveries.

In essence, Walker's position is: First, that in the process of cell-division some parts (the chromosomes) of the cells involved in fertilization are distributed in an alternative (Mendelian) manner, while other parts (the cell protoplasm) simply divide in bulk; secondly, that we must distinguish two classes of inborn characters—the individual (traits in respect to which the individual varies from the race) and the racial (traits in respect to which all individuals of a race are alike). Thus, a dark skin, thick lips, prognathous jaw and woolly hair are common racial characters of the negro, while immunity from certain diseases, *e. g.*, malaria, is an individual character. The comparatively stable racial characters may have been derived in the course of evolution from the comparatively unstable individual characters. Now, the evidence at our disposal, says Walker, shows that only individual characters can be transmitted in an alternative manner. Racial characters exhibit blended inher-

itance and are borne by some other part of the cell than the chromosomes, very likely by the whole protoplasm of the cell.

The obvious difficulty that arises in the case of sex, which is a racial character, yet with alternative inheritance, is met by the general argument that natural selection has preserved the alternative distribution of sex on account of the distinct biological advantage of separated sexes, with the consequent check on in-breeding.

The author has little to say about mental inheritance and education, and that little betrays, in our opinion, some lack of psychological insight. He thinks instinct is of small moment in man (p. 214). "Very little besides consciousness, memory, capacities for making various acquirements and a few instincts is inborn" (p. 48). Nearly everything mental is due to acquirement; hence any form of education which limits the making of mental acquirements must be fundamentally wrong. A new and simple view of play is advanced: "Play is an instinct produced by the action of natural selection, and is primarily no more than an inborn impulse to move about quickly and exercise the body, limited only by temporary exhaustion" (p. 50).

The book treats in a clear manner many topics that should interest students of genetic psychology and education, *e. g.*, the mutation hypothesis, Mendelian and Galtonian inheritance, immunity to disease, recapitulation, regression, experiments with the transmission of acquired characters, the inheritance of diseases, deformities and defects, the probable effect of adopting certain socialistic theories, etc.

G. M. W.

LUCY HOESCH-ERNST. *Das jugendliche Genie: anthropologisch-psychologische Studie*. Sixième Congrès intern. de psychologie, Geneva, 1910, 674-684.

Georg Széll, the subject of this study, is a youthful musical prodigy of extraordinary promise, born at Budapest, in 1897, of well-to-do parents, and representing a Magyar type, with a mixture of Semitic blood. He was their first and only child, and inherited a healthy and vigorous constitution, which enabled speedy recovery from scarlet fever and lung fever. He is rather short and plump, has ashy-blond hair, and bluish-gray, near-sighted eyes. His skull is brachycephalic (index about 82). In weight, height, chest circumference and all head dimensions he exceeds the average for his age and type—a circumstance that the writer thinks assures us of the fruition of his genius.

The fact that this boy is not well known is due to the good sense of his parents, who, as the father puts it, have sought to let him develop quietly and "only to let the world know that there is something doing." Thus he has, at 12, appeared in but four public concerts—at Vienna and London.

Concerning the early appearance of his genius, his father states that he could speak intelligibly at nine months, that at 18 months he could sing correctly 40 songs in three different languages (Hungarian, German and French), and that the striking of false notes on the piano would at that age set him in tears. By four he had learned to read and write without instruction simply by asking questions about the meaning of letters. At this age he could not read music, but used to sit at the piano and "play what was in his mind." Both father and mother have a good ear and an intelligent comprehension of music, but there does not appear to have been any extraordinary development of musical ability in either family. Georg's first written compositions date from his sixth year. At seven he began systematic study of music and harmony under Professor Roberts of Vienna. An aria composed in his tenth year and completed in less than an hour shows remarkable maturity. In general, he dislikes sentimental music, and his original compositions are almost all of a formal classical type. Praise has not turned his head, as he is very critical of his own work, and declares that of his 200 compositions no more than 20 have any real value. All this work is done with the pen at his desk and without trial on the piano. He says: "I hear it all."

Georg's mental traits and capacities have been studied by Dr. Hoesch-Ernst by the use of such tests as immediate memory for words and numbers, free and restricted association, esthetic judgment, description and report. Without going into details, the general results indicate that the youth is precocious, but not premature in development. He has passed through the ordinary stages of development, only more rapidly than others. The author is inclined to think that the awakening of sex during adolescence will develop his emotional life and that his musical genius will become correspondingly enriched. In the light of the present-day discussion of the relation of physiological age to mental development, it may be worth noting that Georg had apparently not reached puberty at the age of 12. However, the evidence for this seems to be confined to the statement that at that time he still spoke in all seriousness of "the stork."

C. J. ROGERS.

OTTO BOODSTEIN. *Der Kinder geistiges Erbteil von Vater- oder Mutterseite.* Zeitschrift für Experimentelle Pädagogik. 10: Heft 1, 1-56.

The author of this article believes that parents do transmit to their children not only physical characteristics, but a mental inheritance as well. He endeavors to point out, as far as possible, the particular mental characteristics which the child received from each of its parents, together with such characteristics as may have come to the child by way of social inheritance. He bases his investigation upon the biographies of representative men and women in different walks of life, referring in particular to their own testimony regarding the matter under investigation. The term "mental inheritance" is used in a general sense, including what is technically understood as heredity and all such environmental factors as contribute to the development of the child up to the age of mental maturity. The article is too profuse and loose in method.

PAUL WILHELM KNUTH.

MACLEOD YEARSLEY, F.R.C.S. *An Investigation Into the Occurrence of Adenoids in Three of the London County Council Elementary Schools.* British Journal of Children's Diseases, February and March, 1910. (From the author's summary, Internationales Archiv für Schulhygiene, 7: January, 1911, 129-130.)

In three schools 2315 children were examined for enlarged tonsils or adenoids, with special reference to their relation to age, sex, ear complications, dental condition, shape of palate and aprosexia. About half of these children were sent up for examination by teachers on account of colds, mouth breathing, inattention or ear troubles. The remainder, 1246, constituted a group in which all children were examined, regardless of suspected defect. Of these 1246, 56.9 per cent. were normal, 5.2 per cent. had enlarged tonsils, 10.5 per cent. had adenoids only, and 27.2 per cent. had both tonsils and adenoids.

A group of 174 complete or partial "mouth breathers" developed 57.5 per cent. with both adenoids and tonsils, 29.3 per cent. with adenoids only, and only 15.5 per cent. "normal," but these last showed various types of nasal obstruction due to causes other than adenoids.

Tables of age-incidence show that adenoids are most common at about eight years and next most common at about 12 years.

Yearsley believes that, if there is any relation between adenoids and abnormally high, narrow palate, it is possible that the palate

shape is rather a cause than a result of the hypertrophy of the pharyngeal tonsil.

His conclusions concerning aprosexia, which he discusses at some length, are "that true aprosexia is often confused with apparent dullness due to defective hearing; that true aprosexia occurs in only about 4.7 per cent. of adenoid cases; is more frequent in girls, and, when present, is associated with a marked degree of adenoids."

Ear complications, *i. e.*, deafness or discharge, were found in 51 of the 1246 children, and it is noteworthy that "every single one of these children had adenoids," while "in no normal child was there any sign or history of ear complication. It follows that, out of 147 cases of adenoids, 34.7 per cent. suffered from ear complications, and this "strongly emphasizes the fact that the large majority of ear affections in school children owe their existence to adenoids."

C. J. ROGERS.

MORRIS LLEWELLYN COOKE. *Academic and Industrial Efficiency.*

The Carnegie Foundation for the Advancement of Teaching,  
Bulletin No. V. 1910.

The Carnegie Foundation detailed a consulting engineer to make a study of the efficiency of the department of physics in eight large and representative institutions from a business point of view. The investigator was intentionally selected from outside of academic circles. This report, which contains the results of the investigation, marks a significant event in the development of educational ideals and institutions of this country, partly because "scientific management" is the slogan of today in the industrial world and partly because, as applied to education, it will lead to the examination of the basal principles of university organization.

It is, therefore, difficult to get an unbiased reaction to this report. It seems to be an inviting subject for the lampoon and the jest in the comic columns. Some of the notices it has received remind one of the old jibe: first, nobody would be fool enough to believe what is said, and second, everybody always has known what is said. One set of critics will deny that the principle of scientific management as developed in industry can be applied in academic life, while another set of men will maintain that scientific management is applied, and was applied in academic work long before it was in industry. Be that as it may, the subject is vital and the content of this report should be judged in the light of the author's claim that:



"Unless my suggestions shall tend to assist those conducting these institutions and their students toward the attainment of their own highest ideals in scholarship, character development and culture, this study will fall far short of the purpose for which it was undertaken, for as Dr. Eliot has said: 'Education for efficiency must not be materialistic, prosaic or utilitarian; it must be idealistic, humane and passionate, or it will not win its goal.'"

The present reviewer believes that while there are many weaknesses in the report, it will serve a purpose and will have a most wholesome influence in stimulating readjustment of university organization both in teaching and in research, as well as in type of government. It will force us to consider such questions as this: Is our present type of university organization the most efficient? Do we have the most efficient form of business administration in the department? Is each man working at his best? Are we getting the best returns from our equipment? In what direction should we expand, and why? Are the rewards of the academic man equitably distributed? Are the lines between research and teaching rightly drawn? Have we relieved ourselves of the routine clerical and janitorial work which can be done by cheap labor? Have we developed the most efficient co-operation between departments and within the department?

While the report is suggestive on all these points, its main value lies in the raising of questions by piling up concrete data gathered by an expert. The first seventy pages of the report contain a discussion of results with recommendations, and the last fifty pages contain tabulated data. The committee type of organization is rejected as "genuine committee management invariably involves lack of initiative, division of responsibility and log-rolling." The military, or one-man, form of government is also rejected and the solution is found in "functional management." "The chief object in functional management is to safeguard the man in the highest kind of work he is capable to perform." "It is based on the belief that there is one best way to do any one thing and that usually this best can be determined by scientific methods, if people will use them. Under functional management every effort is made to discourage the practice of deciding matters—big or little—on anyone's personal opinion. The attempt is made to limit the field wherein arbitrary decisions control action. This means for everyone connected with the universities a more sharply defined function." The student-hour is proposed as a

unit in the measuring of efficiency. This is to be interpreted both qualitatively and quantitatively. Discussing the teacher as a producer, he points out the advantage of having as a stimulus to efficiency, limited tenure of office, remuneration varying with efficiency, relief from work that can be done by cheap labor, assignment to one's most effective place in the department, co-operation, shorter hours, etc. He then suggests certain principles of economy in research; proposes a "general board of research" for supervision in new undertakings, means of evaluating the results of research, division of labor in research, economy in equipment, etc. Under the head of functional activities he outlines the plan for superintendents of grounds, janitor service, purchase department, stores, mail handling, bursar's department, disciplinarian, bureau of publicity, registrar and bureau of inspection. Functional administration is centralized. In order to gain greater advantages there must be supervision, accounting and planning in all branches of the work. And the fundamental principle is: Each man shall be expected to do that which he is best qualified to do.

C. E. S.

WILLIAM R. GEORGE. *The Junior Republic: Its History and Ideals.*  
New York: D. Appleton & Co., 1910. Pp. 326.

Perhaps no single institution has excited as much interest among philanthropists, sociologists and educators as has the George Junior Republic at Freeville, N. Y. For this reason, an authoritative account of its development, from the pen of its founder, has a special appeal. Nor does Mr. George's narrative belie our expectations. The book is full of human interest: it is suggestive and inspiring as well as entertaining.

The first third of the book is mainly historical in character. It unfolds the development of the "Republic" idea, and shows, in particular, how the cardinal principles that now govern the institution ("Nothing without labor," "Trial by jury," "The republic idea," etc.), and which may seem to the casual visitor of to-day to be obvious and simple, were, in every case, the fruits of the "trial and error" method of discovery.

In the remainder of the book, an account is given of some of the chief episodes in the organization of the system, *e. g.*, "The Rise and Fall of the 'Free Tin Party'" (Ch. VII), and the reader is treated,

by pictures and verbal description, to a visit to the institution as it exists at present.

In the concluding chapter, Mr. George discusses the methods of starting a republic. Herein are enumerated the ten principles of Mr. George's "*Uredo*," which we venture to paraphrase as follows: (1) Normal, healthy boys are pretty much alike, the world over, regardless of class or social condition. (2) Hero-worship, dare-deviltry, love of praise, curiosity, comradeship and lawlessness are fundamental components of boy-nature. (3) Superabundant physical energy is bound in every boy to find an outlet somehow. (4) These mental and physical traits, coupled with the care-free condition of youth, make more or less inevitable "a vigorous crop of wild oats during the 'teens.'" (5) This "transit of 'fool's hill'" is terminated, for the average boy, only when he comes to feel responsibility for himself or for others, when, in other words, he becomes "a World's Worker." (6) There are two sorts of these Workers, those who do right for right's sake, and those who do right for policy's sake. (7) Opposed to the workers are the lawless, who are youth still in their teens, or maturer individuals who have not yet felt the saving shock of responsibility. (8) The workers come to forget their own wild oats and are too apt to have no sympathy for misdemeanors of the lawless; so they demand a *System* for their reformation. (9) This *System*, which in the concrete is known as Prison, Reformatory, etc., is unnatural and un-American, and it fails of its purpose because it neglects the individual for whom it was devised. (10) The only remedy for this failure is the organization of such a community or village as the Junior Republic, wherein is incorporated the opportunity to learn the essential lesson of responsibility. G. M. W.

J. E. WALLACE WALLIN. *Spelling Efficiency in Relation to Age, Grade and Sex, and the Question of Transfer*. Educational Psychology Monographs. Baltimore: Warwick & York, Inc., 1911. Pp. vi, 91. \$1.25.

This monograph is a careful scientific study of some of the results of the special attention given by the Cleveland public schools to improve the spelling of its pupils. That such painstaking investigations of the pedagogy of elementary school subjects are being made by trained scholars leads us to expect that before many years teaching will be elevated to a more scientific basis.

Chapter I is devoted mainly to a psychological discussion of the

merits and defects of the incidental and drill methods of teaching spelling. The author shows in a convincing manner that the incidental method may not be properly applied to teaching spelling, because spelling is "one of the most obvious examples of subject-matter that is *instrumental* in value and invariable and *mechanical* in nature, and of which every socially efficient person must have an *automatic* command." He then proceeds to describe the three fundamental factors of a good drill method, namely, initial focalization of attention, attentive repetition and a final state of automatic behavior. While these factors are important, it would seem as if insufficient attention was given to establishing in the pupil's mind the *meaning* of the word to be studied. The association paths that we wish pupils to form should always begin with the meaning of the word and end with the written form; consequently failure to emphasize the meaning is one of the great causes of the poor results thus far obtained from much of our spelling instruction. The spelling method used in the Cleveland schools, as described elsewhere by Dr. Wallin, does give reasonable consideration to the meaning of the word, and accounts largely in the reviewer's judgment for the excellent results obtained in composition spelling. Likewise the question of transfer of spelling ability from column drill to composition writing, which is discussed in Chapter IV, depends upon the *kind* of column drill in question. If the column drill includes much emphasis upon meaning and considerable dictation practice, we may naturally expect that the results will transfer to composition work, and this is exactly what Dr. Wallin's tests showed. He found that the difference between the column and composition tests amounted to only 1.44 per cent.—an amount so slight as to be almost negligible. In fact, there were five instances in which there was a positive gain, but as these cases all occurred in the same school, one is led to regard them with more suspicion than does Dr. Wallin.

Chapters II and III give a careful statical analysis of the general results of the Cleveland drill methods, irrespective of the question of transfer. A general spelling efficiency for all schools of 97 per cent. is remarkably good—much better than that shown by the tests of Kratz, Chancellor, Rice and Cornman. Dr. Wallin agrees with Rice and Cornman that girls are more proficient spellers than boys, but it is interesting to note that the superiority of the girls is less striking in the composition tests than in the column tests.

On the whole, Dr. Wallin's monograph on spelling is an important addition to the literature of the subject. It presents convincing evidence to prove that spelling may be taught effectively by the right kind of drill. As for the question of transfer of spelling ability, all we can say is that the kind of drill method used in the Cleveland schools does transfer its results to the composition writing of its pupils.

HENRY C. PEARSON.

Horace Mann School, Teachers College.

## NOTES AND NEWS.

It is interesting to note in the current number of the *Pädagogischer Jahresbericht* (Brandstetter, Leipzig) that there are at present 441 **SPECIALIZATION IN EDUCATIONAL JOURNALISM.** educational journals published in the German language. We are fast coming to the same condition in this country, and it is high time that educators get together to make a reasonable division of the field among the educational journals and thereby encourage specialization and co-operation in such a way that the output in any channel may be fairly homogeneous and reasonably obtainable. This is one of the first steps in the foundation of a science. In all the leading sciences there are a few purely educational journals of international character for the publication of contributions to the sciences, and these are supplemented by systematic reviews, usually under the patronage of the leading association. The immediate need in educational journalism is, first, the division of the field into as many journals as there are distinct phases of educational problems, each to stick to its own last and seek national, if not international, support; and, second, the establishment of one large review devoted exclusively to classified summaries and reviews grouped topically. C. E. S.

We observe with interest that the Binet scale for the measurement of intelligence is being more and more widely used. Its use in New **THE BINET SCALE.** Jersey is prescribed by law in the case of all pupils who are more than two years behind the grade to which they would normally belong. Early in October the daily press told of the employment of the tests by Dr. Max G. Schlapp of the Cornell Medical School in connection with the Children's Court of New York City. A boy of fourteen, arraigned before the court, was found to have a mentality of nine and one-half years. We are informed that the teachers of the public schools in Philadelphia are being instructed to apply the tests in their classes. It is true that some educators view with alarm the promiscuous use of the tests by those who have had no training in mental measurements. Binet himself, and all

those who have worked extensively with the tests, emphasize the necessity for skill and deftness in their administration. Furthermore, it must be admitted that the tests are not perfect. Almost every experimenter who has used them has suggested improvements, and many of these suggestions have been incorporated in the latest revision of the tests, which appeared in the *Année Psychologique* for 1911. The fact remains, however, that this scale forms the best measure of intelligence that we have, and we are convinced that vastly more good than harm will result from its use. Teachers in applying the tests to their pupils will be led to see them in a new light and will appreciate more keenly some of the handicaps under which the children work. Our greatest need is for further tests in school subjects, with standard scores for different ages, to supplement these tests of "general intelligence."

J. C. B.

English and American representatives met at University College, London, on September 4 for a series of meetings extending over a fortnight to discuss the details of a complete scheme of simplified spelling and to plan a campaign of lectures and press articles for the promulgation of the movement. "It is generally felt," in the opinion of the conference, "that, particularly for the children attending elementary schools, a system of simplified spelling would mean an enormous gain in time, and generally from an educational point of view would have very beneficial results. Incidentally, it would remove the principal barrier to English becoming the universal language."

President William T. Foster of Reed College, Portland, Ore., who has recently visited over 100 colleges and universities in the United States, writes in the *New York Evening Post* that "the most significant aspect of higher education in America today is the increasing respect among college authorities themselves for the scientific study of education." Instead of the old scorn of "pedagogics" and the conservatism born of inertia, college authorities are showing a new attitude toward the problems of administration and instruction. Among the many investigations which the various institutions are conducting we are pleased to note one undertaken by the University of Wisconsin on the actual effect of co-education upon the college work of both men and women.

We observe from a current number of *La Escuela Mexicana* that the normal school constitutes a problem in Mexico as well as in Italy and the United States. The charge is made that the instruction is too vague, too remote from the actual work of the elementary schools. Incidentally, we note that the school hours for the lower grades are from 8.30 to 11.40 and from 3.00 to 5.00.

A new department of hygiene and physical education has been established at Princeton this year under the direction of Prof. Joseph E. Raycroft, formerly of Chicago University. Dr. Raycroft will give a course of lectures on hygiene, and will be assisted in the work of superintending college athletics by Dr. Edwin Fauver, formerly of Swarthmore, Mr. Frederick W. Leuhing, formerly of Ripon College, Mr. Frank J. Sullivan and Mr. John E. Wolf.

The Silliman lectures for 1911 at Yale University will be given by Prof. Max Verworn of the University of Bonn. The subjects are as follows: 1. Historical Observations on the Doctrine of Irritability. 2. The Meaning of Stimuli. 3. The Special Characteristics of Stimuli. 4. The General Effects of Stimulation. 5. The Analysis of Excitation. 6. The Conductivity of Excitation. 7. Refractory Period and Fatigue. 8. The Interference of Excitation. 9. The Interference of Excitation (Continued). 10. The Processes of Depression.—*Science*.

According to *Nature*, Aberdeen University is undertaking an inquiry leading to more definite information on the migration of birds. Aluminum rings stamped with identification marks will be placed on the feet of a large number of birds, and any who notice birds wearing such rings are requested to report the place, date and identification mark to the university.

The Academy of the University of Illinois was abolished at the close of the last academic year, and the courses in practice-teaching, heretofore offered in the Academy by the Department of Education, have been withdrawn for the present year. These courses will be extended and developed as soon as suitable quarters are provided for a model high school.



President Alfred Bayliss of the Western Illinois State Normal School, Macomb, died near Woodbine, Iowa, on August 27 as a result of injuries sustained in a fall from his horse. Mr. Bayliss served two terms as State Superintendent of Public Instruction prior to accepting the presidency at Macomb. With Dr. W. O. Krohn he was instrumental in founding the *Child Study Monthly* about sixteen years ago.

At Middlebury College Raymond McFarland has been promoted to be professor of secondary education. Professor McFarland will do field work during the first half of the current year, inspecting the secondary schools of Vermont. Dr. Collins, head of the department of pedagogy, has made arrangements for training students in teaching. The Middlebury High School furnishes the opportunity, and the work is conducted with the co-operation and under the supervision of Principal A. S. Harriman.

At Harvard University Profs. Paul H. Hanus (education) and Edwin B. Holt (psychology) have leave of absence from the university for the academic year 1911-1912.

The New York State Commissioner of Education has named Professor Bristol of Cornell University a member of the board of retirement for public-school teachers.

At Northwestern University Robert Harvey Gault, Ph.D., has been advanced from an instructorship to an assistant professorship in psychology. Professor Gault has also been appointed editor of the *American Journal of Criminology*.

Dr. L. R. Geissler has resigned his position as instructor in psychology at Cornell University to undertake special investigatory work as associate psychologist with the National Electric Lamp Association at Cleveland, Ohio. Dr. Geissler will conduct experiments in the field of visual sensation.

Dr. Lotus D. Coffman (Ph.D., Columbia) has been appointed to a lectureship in education at the University of Illinois. Dr. Coffman retains during the present year his former position as superintendent of the training department of the Eastern Illinois State Normal

School at Charleston. He lectures at the university on Mondays and Tuesdays.

Mr. F. W. Thomas, formerly principal of the University of Illinois Academy and supervisor of practice-teaching in the School of Education, becomes principal of the high school at Santa Monica, Cal. Mr. G. M. Palmer, formerly supervisor of practice-teaching in English, has been appointed to the English department of the University of Montana. Miss Frances Morehouse, supervisor of practice-teaching in history, takes a similar position in the Illinois Normal University at Normal. Mr. J. P. Gilbert, supervisor of practice-teaching in biology, has been made head of the department of biology and agriculture in the Southern Illinois State Normal University at Carbondale.

## CURRENT PERIODICALS.

(In this section only such articles will be noticed as bear directly or indirectly upon the interests of this Journal.)

PROCEEDINGS OF THE FIFTH CONGRESS OF THE AMERICAN SCHOOL HYGIENE ASSOCIATION. Vol. III, 1911. LUTHER H. GULICK, M.D. *Measurements as Applied to School Hygiene*. 18-21. (Reprinted in this JOURNAL, June, 1911.) CHARLES W. ELIOT. *School Instruction in Scr-Hygiene*. 22-26. (Reviewed elsewhere in this JOURNAL.) WILLIAM E. WATT. *Vital Results Obtained in a Kindergarten from One Year's Work in the Open Air*. 26-33. Comment on experiments with open windows in the Graham School, Chicago. Largely personal opinion and in part positively absurd, e. g., the assertion that window glass shuts out ultra violet rays of light and is therefore unhealthy. WILLIAM A. STECHER. *An Inquiry Into the Problem of Desks for School Children*. 33-39. Measured 5676 Philadelphia school children for sitting height and height of elbow and then prepared tables to show proper number of desks of given dimensions needed for each elementary grade. ARTHUR TRACY CABOT. *School Inspection in Small Towns*. 40-43. The experience of Canton, Mass., shows that for small towns a school nurse is effective and economical, and better than a school physician. S. W. NEWMAYER. *Evidences that the School Nurse Pays*. 44-51. A comparative statistical study of the work of school physicians with and without the assistance of school nurses, showing that the nurses are worth while because they bring results and action. A. JACOB. *Contagious Diseases*. 51-58. A somewhat technical discussion of diphtheria and scarlatina. LINNAEUS NEAL HINES. *Some Suggestions for a Course of Study in Hygiene*. 58-64. Treats of the spirit and aim of the teaching of hygiene in the elementary school. WALTER S. CORNELL. *Good and Bad Forms of Record Keeping*. 65-73. Criticism of forms commonly used in medical inspection, with suggestions for their improvement. HELEN MACMURCHY. *How to Find the Feeble-Minded Child*. 73-81. It is worth while to seek out the feeble-minded for the sake of protecting other pupils and society at large. Some general suggestions are given for conducting this work. WILLIAM H. BURNHAM. *Recent Studies of Fatigue in Relation to the Need of Oxygen*. 81-87. (Reprinted, with modifications, in this JOURNAL, October, 1911.) MAZYCK P. RAVENEL. *The Formations and Functions of Hygiene Committees for Universities*. 88-97. In-

teresting account of the formation and work of the hygiene committee of the University of Wisconsin that provided better ventilation, humidified air, safe water, hygienic sweeping, instruction of janitors, inspection of lodging-houses and other reforms. MYLES STANDISH. *Should the Examination of the Eyes of School Children Be Conducted by the Teacher or the School Physician?* 98-101. The former, because he can detect myopia and the main indirect symptoms of hyperopia, whereas the employment of expert school oculists is out of the question and the superficial examination of the school physician may do more harm than good. W. S. SMALL. *The Boy and the Cigarette: How Best Present the Evils of Smoking to Adolescent Boys.* 102-105. A certain percentage of high-school boys will be influenced by definite scientific statements of the economic, esthetic, physiological and psychological arguments against early smoking. ROSALIE S. MORTON. *The Work of the Public Health Education Committee of the American Medical Association.* 105-109. Wants every school to have lectures on catching cold, exercise and rest, habit postures, digestion, and fatherhood and motherhood. HENRY BARTON JACOBS. *The Sanatorium School.* 109-113. Describes the few existing sanatorium classes and pleads for their encouragement in other institutions. RICHARD C. CABOT. *The Consecration of the Affections (Often Misnamed Sex-Hygiene).* 114-120. (Reviewed in this JOURNAL, October, 1911.) LUTHER H. GULICK. *What Our City Schools Are Doing for the Health of Our Children.* 120-125. Statistics from 758 cities with regard to sweeping and washing floors, drinking cups, recesses, adjustable desks and specific instruction on alcohol and tobacco. LYMAN A. BEST. *Proper Sanitation of the Schoolroom.* 126-141. The author of this copyrighted article quotes statistics of the Board of Health of New York City in his attempt to show that contagious diseases of childhood are more prevalent while school is in session, and ascribes this alleged condition to insanitary drinking cups, poor ventilation and unhygienic sweeping. (Query: What good is medical inspection in New York?) *Report of the Committee on the Standardization of School Books, etc.* 141-144. Résumé of certain norms of hygienic printing already laid down by experts and a few suggestions as to points to be studied further. JOHN J. CRONIN. *Status of Medical Inspection in the United States.* 144-148. Statistics concerning the main features of medical inspection in 337 cities (all that reported such inspection out of 1400 inquiries). THOMAS A. STOREY. *Individual Instruction in Personal Hygiene.* 149-152. At the College of the City of New York the author supplements class instruction in hygiene by personal examinations of all students, who must follow up the advice given or show cause for failure to do so. PHILIP KING BROWN. *A Brief Review of the Situation in San Francisco, etc.* 153-155. Shows a curiously inadequate system of medical inspection for a city of its size. DAVID SPENCE HILL. *The Status of School Hygiene in Tennessee.* 155-163. Treats

of the teaching of school hygiene, the sanitation of schoolhouses, medical inspection, etc. FRANK IRVING COOPER. *Schoolhouses and the Law*. 163-177. Valuable summary, with chart, of legislation of each State dealing with schoolhouse construction. Only eight States have laws worthy the name! JOHN W. BRANNAN. *Open-Air Schools in the United States*. 177-181. Brief historical and descriptive account. EVELYN M. GOLDSMITH. *The Place of the Crippled Child in the Public School System*. 181-186. Description of special classes in New York, Chicago and various European cities.

ARCHIVES DE PSYCHOLOGIE. Vol. X, No. 40, February, 1911. EDMOND CRAMAUSSEL. *The Sleep of a Small Infant*. 321-326. Report of pneumographic tracings taken during sleep on a baby at the age of 10 days, 45 days, and 3 months. The curves show at 10 days marked irregularity, with slow, hesitating inspiration, followed by rapid exhalation and little response to auditory stimulation; at 45 days and later, regularity, but response to stimulation. M. H. VAN GENNEP. *Drawings of a Child and Prehistoric Drawing*. 327-337. An account, illustrated by 24 cuts, of the drawings from copy of a five-year-old girl. The fact that objects can be drawn more easily and better than can letters or geometrical designs is used to explain why primitive art is realistic rather than symbolic or conventional. JULIA DEGAND. *Observations on a Deaf Child*. 378-389. Tells how a deaf-mute boy developed the concept of time, how he first learned of his infirmity, and calls attention to certain interesting peculiarities in his acquisition and use of language.

LA REVUE PSYCHOLOGIQUE. Volume III, 1910. No. 1, March. J. VARENDONCK. *Phobias of Children*. 5-45. A study of the fears of 1549 children. The most common cause of fear was animals. Then came strangers, members of the family, school, natural phenomena (darkness, thunder, lightning, fire, water), imaginary beings, etc. There is a good critical survey of the literature of the subject. VARIA KIPIANI. *The Reform of Reading and Writing for both Seeing and Blind in Relation to the Laws of Symmetry*. 51-55. The author deplores the present asymmetrical method of reading and writing from left to right, and advocates an alternation of left to right and right to left in reading, and a similar alternation with a training of either hand in writing. I. IOTYKO. *The Law of Specific Energy for Contractile Substances*. 56-62. Muscular tissue shows two kinds of contraction, tetanic (caused by rapidly succeeding impulses) and tonic (which is continuous). The former is due to the action of the fibrillar substance; the latter to the sarcoplasm. Each of these substances possesses its own specific energy and its own adequate stimulus. E. ABRAMOWSKI. *Dissociation and Transformation of Normal Subconsciousness*. 63-80, 187-209. A valuable experimental study of the subconscious by the memory method (cryptom-

nesia). "Normal subconsciousness is a differentiated and creative mass, which presents different degrees of psychic vitality and of dissociation, according to its more or less intellectual origin, and which, in its submerged state, executes two simultaneous inverse movements, approaching the threshold of consciousness and receding from it." No. 2, June. ARTHUR ROMBOUTS. *Suggestion and Education*. 113-163. There is nothing that the teacher should study more carefully than the nature, the principles and the art of suggestion. VARIA KIPIANI. *Suggestion in Social Life*. 163-177. An elaborate appreciation of Bechterew's *La Suggestion dans la Vie Sociale*. H. LORENT. *Inaccuracy of Speech Among Pupils*. 177-187. An interesting and valuable study of the linguistic faults of Belgian children, who use French as the medium of communication in the schools, but whose home dialect is Walloon. AD. FERRIÈRE. *The New Education in Theory and Practice*. 209-236. The author distinguishes three phases of education, the traditional, the intuitive and the psychological, and details the efforts that are being made to develop the third phase. No. 3, September. I. IOTAYKO. *Overpressure in the Schools*. 265-297. A valuable resumé of this vexed subject, with a synoptic table of the symptoms of mental fatigue, collated from the leading authorities. N. BRAUNSLAUSEN. *Methods of Teaching Foreign Languages. An Experimental Study*. 298-306. After a survey of previous experimental studies in language teaching, the author presents the results of his own experiment on the best method of retaining Latin words. He found that the association "object-Latin word" was the most efficacious, followed by "German-Latin," while "Latin-German" was the least economical method of memorizing. I. IOTAYKO AND VARIA KIPIANI. *The Psychological Bases of Sensorial Education*. 306-312. Twelve laws are formulated which set forth the contribution of sense psychology to the resources of the educator. W. BECHTEREW. *The Objective Method Applied to the Study of Personality*. 312-320. The objective method regards human behavior as a complicated chain of reflexes, each linked to the other in the relation of cause and effect. The author regards this as a much more promising method of studying personality than anything that introspective psychology has yet offered. I. IOTAYKO. *Mathematical Prodigies*. 320-328. A psychological study of Mlle. Uranie Diamandi, the young Greek arithmetical prodigy. VARIA KIPIANI. *Colored Visualization and the Chromatic Sense of Mlle. Uranie Diamandi*. 329-335. The subject visualizes letters, numbers, days of the week, etc., in terms of color. An extensive table of these colored characters is given. LOUISE VAN DER NOOT. *Rôle of the Senses in Children's Memorizing*. 335-343. An experimental study of the part played by sight (brightness and colors), taste, smell, touch and movement in the memorizing activities of children of the fifth and sixth grades. J. WEILL AND R. NELLEN. *Contribution to the Study of Children's Memories of Pictures*. 343-348. The material consisted

of landscapes and groups of persons, both colored and uncolored. Colored pictures were the more accurately remembered. Girls did much better with groups of persons, while boys showed no decided preference. No. 4, December. OMER BUYSE. *The Psycho-physical Problem of Learning a Trade*. 377-396. An important contribution to the psychological analysis of industrial education. I. IOTAYKO. *Aptitudes and Instruction*. 396-403. A program for the investigation of (1) the rôle of vision and of the muscular sense in design, and of (2) the rôle of vision, muscular sense and audition in (a) writing and (b) spelling. EMILE DE NÈVE. *Repetition*. 408-415. A compilation of the pronouncements of leading psychologists on the value of repetition in learning. VARIA KIPIANI. *The Congress of Typhlophiles (Friends of the Blind), Paris, 1910*. 416-443. A valuable abstract of the proceedings of this congress.

## PUBLICATIONS RECEIVED TO OCTOBER 1, 1911.

(Notice in this section does not preclude a more extended review.)

J. V. BREITWIESER, PH.D. *Attention and Movement in Reaction Time.* Archives of Psychology, No. 18, August, 1911. Pp. 49. Fifty cents. Cloth, 75 cents.

The author confirms the existence of two types of reaction—the sensory and the motor; finds that the latter is, on the average, 18  $\sigma$  shorter than the former, and accounts for this from the introspective records to the effect that “the preparation to observe interferes with the preparation to react by complicating the total preliminary adjustment and diffusing the available energy over a greater area.”

WARNER BROWN. *The Judgment of Difference, with Special Reference to the Doctrine of the Threshold, in the Case of Lifted Weights.* University of California Publications in Psychology, 1: No. 1, September, 1910. Pp. 71. 50 cents.

“It is argued that the judgment of difference does not consist in a more or less accurate perception of an outward relation, but that it is conditioned by central factors which are independent of the particular presentation in question.”

LAURA A. CALHOUN. *The Law of Sex Determination and Its Practical Application.* New York: Eugenics Publishing Co., 1910. Pp. 254. \$1.50 net.

From observation of human inheritance and experiments with animals the thesis is maintained that sex is determined in the ovary from which the fertilized ovum is developed. In women the right ovary yields males, the left females. Chapters are devoted to telogony and telegyny (influence of previous female on offspring of the male). Speculation on practical determination of sex is always interesting, even though it be in so amateurish and apparently so absurdly simple a vein as this. The author asserts that no one who has followed her suggestions has failed to produce offspring of the sex desired.



ED. CLAPARÈDE. *Experimental Pedagogy and the Psychology of the Child*. Translated from the fourth French edition by Mary Louch and Henry Holman. New York: Longmans, Green & Co., 1911. Pp. vii, 332.

This translation of Claparède's *Psychologie de l'Enfant et Pédagogie Expérimentale* is a valuable addition to the books already available in English covering the field of child study and experimental education. Teachers of education in colleges and normal schools will find it particularly useful because of its extended bibliographies. The summaries of experimental investigations are good and the material has the advantage of being well organized. Like so many men who view the problems of teaching in the lower schools from the safe perspective of a university laboratory, the author evinces occasional impatience at the seeming stupidity of teachers. But, unlike some of his fellow-critics, he is quick to recognize that the problems confronting the teacher of little children are tremendously complicated. "I have just criticised the school," he says (p. 311). "The criticism is easy, but it is less easy to discover how we may be able, without falling into disorder, to take account of the various requirements \* \* \* of all our little disciples."

FRANZ CUMONT. *Oriental Religions in Roman Paganism*. Authorized translation. With an introductory essay by Grant Showerman. Chicago: Open Court Publishing Co., 1911. Pp. xxvi, 298. \$2.00.

M. Cumont is characterized by Professor Showerman as "the highest type of scholar—the exhaustive searcher after evidence and the sympathetic interpreter who mediates between his subject and the lay intellectual life of his time." In this book Cumont crystallizes the results of years of patient investigation, and fashions his interpretation of these results into a picture of Roman life and Roman thought as both were transformed under the influence of the religious ideals which came out of the Orient. The translation is from the second French edition.

ANDREW S. DRAPER, Editor. *Selections from Abraham Lincoln*. New York: The American Book Co., 1911. Pp. 162. 35 cents.

JOHN C. DUNCAN. *The Principles of Industrial Management*. New York: D. Appleton & Co., 1911. Pp. xviii, 323. \$2.00 net.

The discussion of the subject is almost wholly from the economic and material point of view. Little account is taken of the psychological aspect of efficiency. Part I considers the economic environment, Part II the equipment of the plant, and Part III organization

and management. In the third part the author indicates three types of organization—military, functional and departmental—analyzes the character of the labor force, and mentions methods of recording the workers, the raw materials, the finished products and the equipment.

GINA LOMBROSO FERRERO. *Criminal Man According to the Classification of Cesare Lombroso*. New York: G. P. Putnam's Sons, 1911. Pp. xx, 322.

This book will receive a more extended notice.

WILLIAM T. FOSTER. *Administration of the College Curriculum*. Boston: Houghton-Mifflin Company, 1911. Pp. xiv, 390. \$1.50.

An important scientific study of American college conditions. The first extended work of its kind. The author takes the historical method of approach and outlines the development of the American college curriculum under the influence of the various social environments. The second part of the book is critical, and discusses such topics as concentration and distribution of studies, college studies and success in life, quality as well as quantity for degrees, and the scientific distribution of college credits. It is to be hoped that this book will stimulate other studies of a like nature.

JOHN PALMER GARBER. *Annals of Educational Progress in 1910*. Philadelphia: J. B. Lippincott Company, 1911. Pp. 396.

A report upon current educational activities throughout the world, dealing with such problems as vocational and agricultural education, development affecting the public schools and higher institutions of learning, social problems, foreign educational institutions, meetings, etc. A unique year-book. Very serviceable.

K. P. HARRINGTON. *Live Issues in Classical Studies*. Boston: Ginn & Co., 1910. Pp. 76. 75 cents.

The four essays comprising this volume are to be heartily commended as a good-tempered defense of the study of the classics. Like most men who have attempted this defense, the author lays emphasis (although not primarily) upon the disciplinary possibilities of the study of Greek and Latin. Unlike Professor Shorey, however, he does not attempt to answer by mere vituperation the arguments that have been advanced against the validity of the doctrine of formal discipline. His criticism of the superficial cult of the "practical" in contemporary American life is particularly good. He is evidently willing to make the introduction to the study of Latin just as simple and interesting as is practicable, but he does not hesitate to affirm

that any real mastery means effort and struggle. Nevertheless, we are of the opinion that, with a teacher so enthusiastic, sympathetic and sane as Professor Harrington the effort and the struggle would be undergone with a will—as a privilege, in fact. Without implying invidious comparisons, we wish that he had been our Latin teacher.

SAMUEL P. HAYES, PH.D. *The Color Sensations of the Partially Color-Blind: A Criticism of Current Teaching.* Reprint from American Journal of Psychology, 22: July, 1911, 369-407.

Contents that dichromacy, complete insensitivity to reds and greens, is an extreme and exceptional variation, and that the ordinary partially color-blind person does see reds and greens under appropriate conditions of stimulation, also that no part of the normal peripheral retina is wholly or partially color-blind.

MAX HEINRICH. *Correct Principles of Classical Singing.* Boston: Lothrop, Lee & Shepard Company, 1910. Pp. xi, 155. \$1.50.

These essays from the pen of the famous oratorio and *Lieder* singer are somewhat disappointing. The discussions of voice production and placing, breath control, phrasing, diction and tone color scarcely go beyond a few fundamental suggestions, and the analysis of oratorio and recitative singing is limited to some illustrations from the "Messiah" and from Schubert's "Die Schöne Müllerin," with effusively emotional comment.

E. A. KIRKPATRICK. *The Individual in the Making.* Boston: Houghton-Mifflin Company, 1911. Pp. ix, 339. \$1.25.

The author's previous study of the development of mind in the race, published under the title of "Genetic Psychology," is here followed by an outline of the development of mind in the individual, considered from the subjective point of view. The stages of development depend upon the child's social relations, and consist of the pre-social period, the imitating and socializing stage, the period of individualization, the period of competitive socialization and regulation, the pubertal or early adolescent period, and later adolescence. The book closes with a discussion of the relation between development and education.

DR. B. MAENNEL. *Auxiliary Education. The Care and Training of Backward Children.* Translated by Emma Sylvester. New York: Doubleday, Page & Co., 1909. Pp. xi, 267.

A simple, popular presentation of what is being done for the education of subnormal children in Germany, with a concluding chapter by the translator on conditions in the United States.

S. O. MAST. *Light and the Behavior of Organisms*. New York: John Wiley & Sons, 1911. Pp. xi, 410. \$2.50.

This very thorough and valuable study is a credit to American scientific scholarship. Part I contains a condensed yet complete historical review of the ideas and theories regarding movements in plants and animals, with especial reference to tropisms. Part II recounts in nearly 200 pages the results of experimental studies on the reactions of organisms (especially those without eyes) to light stimuli. Part III is a general consideration of reactions to light, including variability and modifiability of behavior. Part IV deals with reactions to light of different wave lengths or to colors. It is an invaluable work for those interested in comparative studies of behavior.

H. C. MCCOMAS, JR., PH.D. *Some Types of Attention*. The Psychological Monographs, No. 55, May, 1911. Pp. 55.

Experiments to discover whether certain individual differences in the manner of attending are typical traits or merely fortuitous and unrelated. The results will be reviewed in a later issue.

ADOLF MEYER, SMITH ELY JELLIFFE, AND AUGUST HOCH. *Dementia Praecox*. Boston: Richard G. Badger, 1911. Pp. 71. \$2.00.

A collection of papers read at the meeting of the American Neurological Association, Washington, May, 1910. In his discussion of the nature and conception of dementia praecox Dr. Meyer urges that the disturbance is not due to hypothetical poisons or incidental lesions, but is rather a derangement of psycho-biological adjustments, and if taken in time is susceptible to preventative education.

*National Society for the Promotion of Industrial Education*. Bulletin No. 13. *Proceedings of the Fourth Annual Convention, Boston, 1910*. Parts I-IV. Pp. 213. Bulletin No. 14. *The Trade Continuation Schools of Munich*. (Address by Dr. Georg Kerschensteiner, Director of Education, Munich.) Pp. 68. New York: Published by the Society, 20 West 44th street. 1911.

The Proceedings contain a number of addresses on each of the following topics: Trade education for girls, apprenticeship and corporation schools, part time and evening schools, and the social significance of industrial education. The bulletins furnish a valuable survey of present conditions.

SCOTT NEARING. *Social Adjustment*. New York: The Macmillan Company, 1911. Pp. xviii, 377. \$1.50 net.

"Adjustment is approximation to the normal—the realization of full potentiality under a given group of circumstances. \* \* \* The realization of full potentiality \* \* \* is conditioned by opportunity." The author accepts as thoroughly established Ward's contention that latent capacity is distributed throughout society evenly and equitably, and that what is needed to increase immeasurably the sum total of human achievement is a happy combination of favoring opportunities. The American public-school system is criticised for its failure to develop latent capacity and for its consequent failure to maintain "the approximation to the normal which is involved in social adjustment." The possibilities of the public schools are legion, especially the possibilities of the elementary schools, "which reaches all of the people, and reach them while they are impressionable children." Maladjustment in society is due to ignorance. The "social conscience" is stimulated by facts; therefore, let the school teach facts—especially facts concerning "personal hygiene, parental duty and responsibility, and social responsibility for securing adjustment." No one will be disposed to quarrel seriously with the criticisms of the author anent the school system or with his general analysis of the various types of maladjustment. We like to think that the public elementary school holds potentially the panacea for most existing social ills. The problem that puzzles us is how to get this panacea into dynamic operation. Toward the solution of this important problem our author offers nothing that is new. His book, however, is well written in simple language and with that clear-cut lucidity of style which characterizes so many of the books in the sociological field, which leads us to remark that sociologists, as a rule, write much better than psychologists and educationists. The book lacks an index.

MAX OFFNER. *Mental Fatigue. A Comprehensive Exposition of the Nature of Mental Fatigue, of the Method of Its Measurement and of Their Results, with Special Reference to the Problems of Instruction*. Translated from the German by Guy Montrose Whipple. Educational Psychology Monographs. Baltimore: Warwick & York, Inc., 1911. Pp. viii, 138. \$1.25.

"This translation of Offner's "Mental Fatigue" has been undertaken because the monograph collates, systematizes and appraises a mass of scattered, and to most readers inaccessible, material that bears upon a schoolroom problem of unquestioned importance."

ALBERT S. OSBORN. *Questioned Documents*. With an introduction by Prof. John H. Wigmore. Rochester, N. Y.: The Lawyers' Co-operative Publishing Co., 1910. Pp. xxiv, 501. \$5.25 net.

Tells about the methods by which the genuineness of a document may be ascertained. Treats of handwriting, ink, paper, erasures, alterations, typewriting, photographic, microscopic and chemical examination of documents. Amply illustrated and full of the fascination of solved mysteries and celebrated cases. Designed for the lawyer and banker, but not without interest for the psychologist.

HENRY FAIRFIELD OSBORN. *Huxley and Education*. New York: Charles Scribner's Sons, 1910. Pp. 45.

Address at the opening of the college year, Columbia University, 1910.

OSKAR PFUNGST. *Clever Hans*. (The Horse of Mr. Von Osten.) New York: Henry Holt & Co., 1911. Pp. xi, 274.

A contribution to experimental animal and human psychology, translated from the German. The story of an educated horse and its explanation.

WILLIAM HENRY PYLE. *The Outlines of Educational Psychology. An Introduction to the Science of Education*. Baltimore: Warwick & York, Inc., 1911. Pp. x, 254. \$1.25.

The book is designed to serve as a general textbook in educational psychology, and is thus the pioneer book of its kind in the English language, for Professor Thorndike's book is avowedly limited in scope to certain aspects of educational measurement. The work treats of body and mind, heredity, instincts, habits, memory, attention and fatigue. The topics most emphasized are instincts and habits in their relation to school activities.

MARY F. NIXON ROULET. *Indian Folk Tales*. New York: The American Book Co., 1911. Pp. 192. 40 cents.

These tales, with the splendid illustrations that accompany them, should prove a source of great enjoyment to the children.

*The Schoolmasters' Yearbook and Directory for 1910-1911*. London: George Allen & Co., 1911. Pp. 404 + 718. 12s. 6d. net.

This valuable directory of English secondary schools is now in its ninth year. In it is to be found the name, residence and brief record of every secondary teacher in England and Wales. But it is far from being a mere directory. Four hundred pages are devoted to a digest

of educational progress during the year just passed, including a chronicle and review of the year, administration of secondary education, educational societies and organizations, universities, colleges and other schools, examinations and inspection, miscellaneous information, and educational publications. We wish it were possible to have something of the sort for American schools.

*The Social Evil in Chicago: A Study of Existing Conditions, with Recommendations by the Vice Commission of Chicago.* Chicago: Gunthorp-Warren Printing Co., 1911. Pp. 399.

A straightforward, conservative, valuable report on prostitution in Chicago, with recommendations looking toward its suppression. To the Board of Education the committee recommends that girls between fourteen and sixteen should receive definite vocational training in continuation schools; that the use of public schools as social centers be extended; that schoolgrounds be open for children under supervision, and that steps be taken to investigate the feasibility of instructing older pupils in social hygiene.

DANIEL STARCH. *Experiments in Educational Psychology.* New York: The Macmillan Company, 1911. Pp. viii, 183. 90 cents net.

This book contains thirteen chapters, with directions for simple experiments, largely without apparatus, on sense tests, mental images, learning, perception, attention, memory, etc. None of the tests are new, but there are some clever adaptations of old tests, and it will doubtless be a convenience for some students to have them brought together between the covers of a book.

EDWARD K. STRONG, JR. *The Relative Merit of Advertisements. A Psychological and Statistical Study.* Archives of Psychology. No. 17, July, 1911. Pp. 81. \$1.00.

An interesting study in pure psychology, the results of which may perhaps be of some commercial application.

MARY E. THOMPSON. *Psychology and Pedagogy of Writing. A Résumé of the Researches and Experiments Bearing on the History and Pedagogy of Writing.* Baltimore: Warwick & York, Inc., 1911. Pp. 128. \$1.25.

The author makes no claim to original experimental contributions to the subject of writing, but she will have performed a service for many in bringing together the experimental data tucked away for the

most part in files of technical periodicals. By permission she has also included Professor Thorndike's scale of handwriting.

CHARLES EDWARD WALKER. *Hereditary Characters and Their Modes of Transmission*. New York: Longmans, Green & Co., 1910. Pp. xii, 239.

Reviewed elsewhere in this JOURNAL.

MARY THEODORA WHITLEY. *An Empirical Study of Certain Tests for Individual Differences*. Archives of Psychology, No. 19, August, 1911. Pp. 146. \$1.25.

A historical survey of the study of individual differences, containing valuable representative lists of tests, is followed by a detailed account of the results obtained from the use of the Columbia freshman tests. The monograph is of great value for educational psychologists.

ROBERT M. YERKES AND JOHN B. WATSON. *Methods of Studying Vision in Animals*. Behavior Monographs, Vol. I, No. 2. New York: Henry Holt & Co., 1911. Pp. iv, 90. \$1.25.

An elaborate description of the latest and most improved apparatus and methods used in studies of light and color vision in animals. It is a report prepared for the committee of the American Psychological Association on the standardizing of procedure in experimental tests.



## THE AIMS, VALUES AND METHODS OF TEACHING PSYCHOLOGY IN A NORMAL SCHOOL.

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For many years a knowledge of psychology has been regarded as indispensable for students of normal schools, and the advantages claimed for it have been in many cases highly extravagant. Few if any tests have been made to measure its real value, and, up to a very recent time, anything like a thoroughgoing psychology of the teaching of psychology has been practically unknown or disregarded. I believe a consensus of opinion would indicate that no subject of the normal school curriculum has been taught worse or with more barren results, in spite of the fact that many of the teachers have been trained psychologists. At present there are many signs that show that we are going to see our way out of the woods. The teaching of psychology is bound to be influenced by the general tendency in education calling for training that actually functions or makes for efficiency. One of the signs of this tendency is Professor Whipple's recent report (11) to the American Psychological Association on the teaching of psychology in normal schools. Such a report is valuable because it shows what is being done in 100 normal schools of this country. Professor Whipple's suggestions for the improvement of the teaching of psychology are timely and helpful. Professor M. V. O'Shea's article (8) in the June number of the *Journal of Educational Psychology* is also highly practical. It seems to me, however, that what teachers of educational psychology and administrators of normal schools need most of all is a general clearing of the ground, a brief, comprehensive, and systematic analysis of the entire situation to determine aims and values and the principles of teaching that would naturally grow out of them. In the following pages, I have tried to do this. I have also suggested some methods which I have found useful in my own classes.

It is self-evident that the general aim of teaching psychology in a normal school must be derived from the aim of the school and from the nature of the subject itself.

The general purpose of the normal school is essentially definite and practical—the preparing of ordinary high-school graduates for teaching effectively in the first eight or nine grades of the public schools. By teaching effectively is meant that direction and control of children which will lead them to be good citizens, men and women with power to think and feel and act in such a way that they may be happy and useful members of society. What is to be taught in a normal school must be decided then from the point of view of its power to promote this effectiveness. The purpose of the normal school determines that psychology shall be taught if it aids the teacher in her work. If taught, it also determines that professional values shall largely guide the selection from its subject matter. The teachers in normal schools have been slow in accepting the idea that the normal school has a distinct vocational purpose the same as any professional school, (as for example) a dental college or a school of technology.

The general aim in teaching psychology in a normal school should be essentially different from that of the college whose standards and methods we inherited. It was only natural that the trained psychologist with his love for philosophical speculation and abstract thinking and with comparatively little interest in elementary education should teach psychology in the normal school according to the practice of the college. This inheritance has prevented the normal school psychologist from making many helpful contributions to the efficiency of the normal school, or to the progress of education in general. Our heritage still befogs the vital issues.<sup>1</sup> Woodworth (10,

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<sup>1</sup>In defining the aims of psychology in the normal school, Whipple (11, p. 33) says that the first aim is "to secure real assimilation of a system of psychology; the second aim is to develop skill in observing and in interpreting the mental phenomena of daily life in terms of this assimilated knowledge." How do these aims differ from that mentioned by Woodworth (10, p. 506) for a college course, that "of training the student to observe his own behavior and that of others as objects of study and illustrations of general laws of human nature"? Should not the aim of psychology for normal schools differ from that of the college by its vocational purpose? Should it not only "develop skill in observing and interpreting the mental phenomena of daily life," but more especially *skill in observing and interpreting the mental phenomena of children of school age?*

p. 503) says that the psychology of a college course should be based upon "a value neither cultural, nor vocational, nor disciplinary—a value which is too wide to be called vocational, too direct to be called disciplinary, and too practical to be called cultural." The psychology in a normal school should differ from that in the college by laying its supreme emphasis on vocational values. This does not mean that the normal school student of psychology should not get much directly, or indirectly that has cultural or disciplinary value; but the *purpose of psychology in the normal school primarily must be vocational*. Such a course must necessarily ignore many speculative problems that might be stimulating and profitable for college students. For example, whether a perception is a copy of reality or only a sign, is a question that should not be considered. Paulsen (7) says, "No theory of knowledge causes the slightest change in the stock and value of our ideas." The psychology in a normal school cannot afford to spend any of its time on speculation like this, which has no practical significance.

The character of the subject matter of psychology also determines its aim. Since psychology is the science which attempts to describe consciousness and behavior, it has been assumed that a knowledge of it is essential to the prospective teacher. The subject is so broad, however, that it is difficult to see how it can be useful unless it promotes an understanding of and sympathy with child life so that the teacher can more effectively cope with the problems of the school. *The ultimate goal of all teaching of psychology in normal schools must be child psychology, especially the psychology of children of school age.*

How is the normal school student of psychology to gain the power to interpret child life? Before attempting to solve this problem, it is necessary to consider the fundamental truth which investigators like Hall, Meumann, Lipmann, Lay and others have demonstrated, namely, that the *mental and physical life of the child differs from that of the adult.*<sup>2</sup> While

<sup>2</sup>"La première chose dont il faut bien se persuader lorsqu'on entreprend des recherches de pédologie, c'est que l'enfant n'est pas, comme on le croit souvent, un homme en miniature. Sa mentalité n'est pas seulement quantitativement différent de la notre, mais qualitativement; elle n'est pas seulement moindre, elle est *autre*. Il faudra donc toujours prendre garde de conclure sans précaution de la psychologie de l'adulte à celle de l'enfant." (2)

this is well known to psychologists, there is little to show that this knowledge has had much influence on the courses in psychology offered in normal schools. It is *the height of absurdity to teach adult psychology and attempt to deduce from it principles for the teaching of children*. Yet adult psychology has its place. While the minds of normal school students border on those of adults and are vastly different from those of children, yet, they have many points in common. It seems only reasonable then that they should begin their study of psychology by studying first their own minds. Dewey has aptly said that "the person who does not know himself is not likely to know others." The criticism that is to be made of the psychology that is taught in normal schools today is not that adult, or what is usually called general psychology, is not taught or that sufficient time is not devoted to the subject, but that such courses do not lead to a sympathetic and practical knowledge of child life. By practical knowledge is meant that kind of knowledge which may become useful in promoting the realization of the ideals of the teacher. There is plenty of evidence in Professor Whipple's report to show that in many normal schools no transition is made from adult psychology to child psychology (11). In fact, the problem of this transition is not even referred to in this report. This suggests that in many normal schools, at least, the instruction in psychology has made only a beginning; for general psychology tends mainly to awaken in students an interest in their own minds and in their own behavior. This is necessary and desirable, but is it not even more necessary that they should be interested in the minds and behavior of children? There seems to be a special need for the cultivation of this interest; for students of normal school age are as far from a sympathetic appreciation of childhood as they probably ever will be. The interest in their own mental activity and in their own behavior should be merely a stepping stone to child psychology.

The introduction to psychology in the normal school should be then adult psychology, or, to be more exact, the *psychology of the student's own self*. If this is to be taught so that it will have practical value, the instructor should first of all

determine the values of various phases of general psychology as suggested by his ultimate aim. He must separate the wheat from the chaff. It is inconceivable, for example, that most careful and scholarly presentation of the theory of color vision, or a demonstration of the histology of the brain, no matter how well they might be understood, could contribute to professional efficiency. It is desirable that the fact of color blindness be known, its evil effects in life and in schools noted, and that normal school students be taught how to test children for color blindness and how to appeal to the individual interests and needs of such defectives. A conception of the gross anatomy of the brain and of the general functions of the brain would be advantageous; but time spent on the details of structure would be largely wasted. It is easy to see that relatively high values should be attached to the study of perception, habit, memory, imagination, attention, and interest. In emphasizing these topics, there is also a danger that considerable time may be spent on that which is analytical or purely speculative and that the instruction may fail to be associated in any vital way with the problems of the schoolroom.

The aims and values of general psychology must naturally consider the transition which is to be made in passing to child psychology. General psychology and child psychology may be more or less differentiated by separate courses or they may be combined in the same course or courses. Personally, I prefer the latter method. In making this transition, students should be led first to explore their own minds. Such adventure frequently leads them back to the reminiscences of childhood. Although these recollections are likely to be incomplete and distorted, for we have all forgotten how we learned the simplest things of life; yet, as Groos (4) has pointed out, they are frequently retained with great vividness and truthfulness (*mit grosser Lebhaftigkeit und True*). If the recall of such memories can do nothing else, they open the way to an interest in childhood. The results of such introspection should finally be enlarged and clarified by the observation of children and by reading on the psychology of childhood.

Allow me to illustrate the kind of transition that I have in mind. A few weeks ago I was taking up the subject of the

concept with students of a first year class. After some preliminary discussion of the meaning of the word and the various concepts that we possess, I asked every member of the class to explain her concept of a mile. Introspection showed that practically every student had two different concepts: one, a purely arithmetical concept, (320 rods) which could be used effectively in doing problems in arithmetic, but was very vague, almost useless in other adaptations; the other, a more practical kind of concept, which for want of a better name, we will call here an empirical concept, that was used with some degree of success in estimating distances. An investigation of this empirical concept revealed the following facts: 1. The exact imagery used was different in the case of each pupil, and, when thoughtfully used, ordinarily referred to some definite experience of distance, such as the distance between the home and the church, or between the home and the school. 2. Some judged distance by comparing any given distance with a visual image that they knew to be a mile; others, by the time taken to walk or ride a mile; and a few by motor images and the feeling of fatigue once experienced in walking a mile. The visual imagery predominated. 3. The nature of the concept used depended largely on the student's environment. The country girl would think perhaps of a distance between two crossroads, while the city girl might refer to an experience of a certain number of blocks. 4. The concept not only grew out of a certain environment, but it was almost useless when applied in a foreign environment. In passing from the country to the city, or from either to the seashore or mountains, it was discovered that a new kind of concept had to be built up. 5. There was little feeling of relationship between the arithmetical concept and the empirical concept, except in cases where the numbers were small. 6. It was realized that the arithmetical concept could have no really vital meaning unless it was re-enforced by the empirical concept. 7. In most cases the empirical concept had not been affected to any great extent by the influences of the school. 8. The empirical concept usually had its origin in childhood. 9. A large number in the class complained of vagueness in the use of concepts, especially when they referred to long distances. 10. A few pupils had no

empirical concept of a mile. A mile to them meant merely some kind of name applied to the measurement of distance. 11. It was realized that it was immaterial what kind of concept was used so long as it could be used with a fair degree of accuracy. 12. Some pupils were troubled by bad methods of learning. One girl, for example, used a measuring unit of a mile and a half (the distance from her home to school). In judging distances she had great difficulty in applying this awkward unit.

The same kind of introspection was directed to determine the characteristics of the concept for acre. The results were similar except that about 75 per cent. of the class confessed that they had no idea of what an acre really meant. Many had a vague arithmetical concept. Other concepts of measurement were considered with like results.

The class work was then guided by questions like these: 1. In what way are your concepts of measurement defective? 2. How do you explain this defectiveness? 3. How would you attempt to correct it? 4. What do your observations of children tell you about their conceptions of measurement? 5. What have you read about children's conceptions of measurement? 6. What concepts of measurement may children get with profit in various grades? 7. Have you observed any teaching recently that had as its aim the development of the concept of measurement? 8. What points would you keep in mind in trying to develop concepts of measurements in your own school?

The above method, it will be noted, makes use of the student's own introspection, reading, and observations, and finally leads her to think of her knowledge in the consideration and solution of problems in teaching. The student's mind is not left centered on her own concept (frequently a result of the study of general psychology), but on the problem of developing the concept of measurement in children.

The fundamental problems of teaching should be taken up after some sort of psychological background such as I have indicated. The student should get into the habit of associating her psychology with the problems of teaching. At the conclusion of the work on interest, why should not the teacher of

psychology propose such questions as these for discussion? 1. What determines the value of an interest to education? 2. What are the sources of interest to children in a reading lesson in the third grade? 3. How would you arrange these interests in their order according to their importance? 4. What is to determine whether a certain interest is to be appealed to or not? 5. What good methods have you observed for appealing to certain interests? 6. What individual differences in interest have you noticed in reading classes in the third grade? 7. How did the teacher appeal to these individual interests?

One of the greatest dangers in the class discussion of school problems is a lack of experience with practical school work on the part of the teacher of psychology. Many of these teachers have never had any teaching experience in the grades, and, in many cases, know almost nothing of the aims and methods of the elementary school. All teachers of psychology in normal schools should have regular periods assigned for visiting schools. It is almost impossible to give courses in educational psychology a valuable educational flavor unless the teacher has first-hand knowledge of what is being done in the public schools.

Another danger is a tendency on the part of the teacher to dogmatize, to treat the same kind of case in the same way. This is pernicious. It is to be remembered that educational psychology of today is mainly the *psychology of individual differences*. Neither in our thinking, nor in our practice can we consider "the child," but rather "children." Binet's criticism (1) of the old point of view is worth quoting. "Il est vraiment antihygiénique, antiéducative de traiter tous les enfants de la même manière." According to President Hall, (5) the principal result of the child study movement has been the directing of the attention of the teacher to individuals rather than masses. We need to emphasize the importance of this new tendency. If the student of educational psychology in the normal school should carry nothing else away from her course but the idea that children differ from adults and from each other, and the ability to recognize some of the conspicuous differences, also the belief that these differences call for a



special consideration of each child by the teacher, the course will have been highly fruitful.<sup>3</sup>

In emphasizing the importance of individual differences, I do not mean to deery class instruction. The problems of school administration make any other plan impossible, and, even if they did not, any other kind of device in most cases would be undesirable. There is probably no more important interest in school work than the social interest. It plays a prominent part in nearly every other interest and in nearly every ambition and ideal. If the great problem of democracy be that of learning how we can best live with each other, the school should contribute its influence toward the socializing of children. Although the school must deal with large numbers, and although pupils must be taught in classes, there is a vast difference between teaching children as masses and as individuals. The real teacher adapts knowledge and discipline to the individual needs and interests of pupils. We need to dwell on this.

There is still another danger that much time will be wasted in a class discussion of problems of teaching because students have not had the necessary experience with children and school which would make such a discussion profitable. I aim to overcome this difficulty by getting students to utilize every possible opportunity to observe children as they meet them in their homes or upon the street. Reports of these observations are handed in and serve to illustrate many points in the lesson.<sup>4</sup> These observations lead students to notice the natural child, the child in relation to his social environment. Students also have regular periods for the observation of school work in the public schools of Worcester under the direction of the supervisors of practice teaching. These supervisors, with the advice of the instructor in psychology, also put printed sheets

<sup>3</sup>In a discussion on the training of teachers, Lay (6) says: "Die Seminaristen haben schon viel gewonnen, wenn sie durch untersuchungen eigens erfahren, dass nicht alle Menschen und nicht alle Schüler in der gleichen Weise beobachten, assimilieren, vorstellen, aufmerken, ermüden, usw. wenn sie nicht durch Worte über 'Individualität' der man noch so wenig weiss, unterrichtet werden sondern durch selbsterlebte Tatsachen bestimmte individuelle Unterschiede, die eigene Individualität und die von andern kennen lernen."

<sup>4</sup>For this device I am indebted to E. H. Russell, formerly principal of the State Normal School at Worcester, Mass.

into the hands of the students to direct their observations. They afterwards talk over the observations with them and give them helpful suggestions for their next period of observation. The supervisors are constantly informed of the work that is being done in psychology, and they aim to correlate this with the observation work and subsequently with the practice teaching. The experience of students in observing children both inside and outside of school give them some kind of foundation for the discussion of practical problems in the psychology classes. The instruction in psychology, in turn, reacts and tends to make them more intelligent and sympathetic observers.

In all the instruction in psychology, frequent reference should be made to the hygiene of the child and the hygiene of the school-room. Although a special course should be given in school hygiene, the opportunity should not be lost by the teacher of psychology to show the interdependence of mind and body and the significance of this for education, not only in a general, but in a specific sense. By all means, let us avoid teaching psychology which treats consciousness as a part from or independent of the body.

As a final recommendation, I think it should be said that if the instruction in psychology is to be of greatest help, it should be placed at the very beginning of the normal school course so that it may serve as a basis for courses in general and special method. In this way it might introduce the student easily and naturally into a professional spirit.

Let us return to more of the specific problems that confront the teacher of psychology in the classroom.

Conspicuous among these problems is that of dealing with the minds of ordinary normal school students. They are immature and incapable of manipulating abstract ideas to any great extent. They have forgotten how and with what difficulty they learned the common things of life. They are also at an age when they have little natural interest in childhood. We should also note that they have no professional spirit. With such a mental preparation, they approach a subject which bristles with abstract and technical terms, the very names of which repel rather than attract.

In Professor Whipple's report (11, p. 11) a common complaint of teachers of psychology is the mental inability of normal school students to use the ordinary text-books in psychology. According to the writer's experience, a common practice is to assign reading in some one of the many scientific text-books on the subject and afterwards to test pupils on their reading. Unfortunately the text-books on the market, while admirable perhaps for college use, are quite unsuited to the needs of ordinary normal school students who are just beginning the study of a most difficult subject. They are so technical as to be almost unreadable, and they contain little or no suggestion as to the application to teaching. To these students of immature minds a dependence on the text-book frequently produces mental paralysis and a pronounced aversion for the further study of the subject. As a student and teacher I have noticed that the close study of one of these text-books by beginners is likely to result in a good deal of verbal knowledge about the mind but in little real familiarity with mental phenomena. Such a result might be overcome by an unusually gifted teacher, but if the text is followed closely and the time devoted to the subject is limited, the energy spent must be devoted largely to the art of verbal classification. Such a course reminds one of the scholasticism of the middle ages, when the students gained their scientific knowledge from the reading of Aristotle, without ever refreshing their souls by the nature about them and without being able to recognize any of the phenomena that they studied about in their own environment. A familiarity with real phenomena may be acquired by the students using the laboratories which they themselves possess but have scarcely discovered, namely, their own minds.<sup>5</sup> Study and experimentation in this laboratory should be made under the direction of the instructor. After this has been done, the students will be able to take up a text-book with greater interest, and may then get information which could not be gained from a class experiment. It is safe to say that the average beginner should never be directed to do any read-

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<sup>5</sup>Yerkes (12) has a delightful way of expressing this: "No one who is unable to observe the wonders of his own consciousness can really enter the kingdom of psychology."

ing until he has had thorough preparation to pursue it with profit.

The lecture method is frequently resorted to. It has its limitations. In dealing with such abstract subjects as psychology, there is always a danger that students may be able to pass a good examination on the lectures but that the reaction may be a purely memory reaction. The lecture is valuable in giving students information which they could not discover for themselves with ease or which is scattered through many books and publications. There is little excuse for a lecture unless students are afterwards tested orally and in such a way that they may be stimulated to think.

I am a firm believer in class discussion, such as I have already illustrated, and in class experiments; but I think there is a danger in laboratory work in psychology becoming too complicated. It is highly probable that the interest in the experiment may become an end in itself rather than a means, that there may be a worship of method and introspection rather than a growth in sympathetic and practical knowledge of child life. The apparatus for the class experiment should always be simple. Let us remember that the normal school should not aim to make the psychologist, whom Titchener (9) has defined as one "enamored of introspection." Let us not forget that a *keen, sympathetic, and practical knowledge of children instead of ourselves is our ultimate aim.* (See footnote 1).

It is desirable that students should know a good deal about the learning process, and they may get much valuable information about it through experiments performed in the class or outside of school. I have tried the plan of asking all my pupils to learn something new, something involving both mind and muscle. They were free to choose anything they wished. Many learned tennis, croquet, golf, basket ball, swimming, sewing, riding a bicycle, etc. Before beginning the experiments students were given some general directions as to what to look for. A record was kept of these experiments. These records offered material for class discussion for several days, and were frequently referred to afterwards.

The problems involved in one's own learning differ in

many ways, however, from that of teaching, or getting somebody else to learn. This is especially true if the one taught is a child. Beginning normal school students usually fail to realize that there is any real problem in teaching. To bring them to a realization of this, I suggested that everybody who could, should teach a child something. The children for this experiment were often found in the students' own homes or in those of their neighbors. The students were at liberty to choose any child for a pupil and to teach whatever they wished. Two-thirds of the class responded to my suggestion.

The following account illustrates in a naive way one student's experience:

"I have taught Mary, age 10, to play ping pong. I thought at first that I would explain the game fully before we started, but found out afterwards that it was better to explain it as I went along. I knew how to play so well that I forgot Mary did not know how to play. I played too fast and had to stop many times to go back to explain something which I ought to have done before.

"After she learned to play a little, I had hard work trying to make her keep to the rules, as she wanted to make rules for herself. It was very difficult for me to remember all the rules as I was so interested in what Mary was doing. I noticed as we went along my mistakes in explanation. I often found that my explanation was too brief and that I had forgotten many little points. I was very glad to have Mary interested; for I noticed that it was then much easier to teach her."

The above experiment is not to be taken as a model of teaching, but, as I have indicated, for an experiment. Such experiments are valuable because they give students some first-class practical child psychology, and because they tend also to give them a professional attitude toward children. Reports of these experiments were read in class and many of them formed the basis for some very important class discussions. Such experiments I regard of greater value than some of the more complicated experiments of the laboratory.

In the light of the present status of the teaching of psychology in normal schools, I think the crying need is not so

much for new and better text-books, or for costly experimental apparatus, or for any special method of teaching; but for a teacher who defines aims and values according to the purpose of the normal school, whose methods are organized for the realization of those aims, whose enthusiasm stimulates students to study their own mental phenomena and those of children, a teacher who is a thorough student of education, a trained psychologist, and an investigator, one who has had practical teaching experience in the grades and has first-hand knowledge of the modern school, who is able to associate the study of psychology with the problems of the school-room; finally a teacher who exemplifies by his own life what should be the *great aim of all teaching of psychology in normal schools—sympathetic and practical knowledge of child life.*

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## ON METHODS OF MENTAL MEASUREMENT, ES- PECIALLY IN SCHOOL AND COLLEGE.

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The present practices of measuring mental accomplishment are largely modifications of the methods used in the physical sciences, and it does not seem to the writer as if enough significance had been accorded the fact that mental accomplishment is much more a matter of relation than are the phenomena of physics. Physical measurements are almost exclusively measurements of spatial extent—scale readings on a thermometer, galvanometer, rule, etc. The relative accuracy of spatial measurement is due to the greater acuity of the visual sense and the ease with which deviations from a given starting point can be evaluated. In physical phenomena secondary effects are easily recognized and eliminated and the experimenter usually knows what he is measuring. The starting point for the number series which is to record the quantitative variations of the phenomena under investigation, may be very arbitrarily chosen and the validity of the results not impaired. The selection of a number series in which the readings shall be made, is for the physicist only a matter of mathematical and practical convenience. The subject-matter of the mental and social sciences does not permit these privileges. A particular degree of ability in one individual cannot be identified so readily in another individual, nor can such deviations as may exist be so easily evaluated as can, say a deviation in height. The reduction of mental measurement to spatial terms is almost limited to the number series employed in identifying certain degrees of accomplishment. Efficiency in the association of ideas cannot be read off in the same way as a difference in electrical potential can be read off from a voltmeter.

A difficulty for mental measurement arises as soon as we ask the question, where shall the number series begin? For the physicist this is not a perplexing problem. In temperature for instance, he will say, "Let us take as our starting point, the position where the end of this column of mercury will be found when it is placed in melting ice." Physical phenomena are of such a nature that this point can be determined readily by other physicists. In mental measurement a highly variable quantity is being measured, the nature of which is not clearly known—which is often obscured by secondary effects or confused with it—and even if deviations are recognized it is difficult to tell whether they are in the phenomenon which is being measured, or in the secondary concomitants or antecedents.

As mental tests are now usually given, each examiner selects as his starting point, zero accomplishment and then divides the test as best he can into equal units which are allowed a constant value. The degree of accomplishment is measured by the number of these units counted. Where this is done the number series varies with the nature of the test and there are about as many different kinds of series as there are tests. Even where the tests are of the same nature a direct comparison of the numbers secured would be invalid, because one of the tests was more "difficult," thus measuring a different range of accomplishment. What seems to be needed is: First, a starting point which can easily be determined—which is affected as little as possible by secondary causes—the deviations of which can be readily calculated and detected. Second, a suitable scale which can be used on all tests and which gives results that are directly comparable, no matter what the nature of the test may be. In this paper the writer hopes to point out a way in which both these factors may be secured. In the first place, instead of using for the final record a scale based on the nature of the test, he proposes to use one which is independent of it, and whose range is from 0 to something over 100. As a starting point he proposes to use the *average of the group* of which the person tested is a member. This average, no matter what the subject-matter of the test may be is then set equal to 50. Dividing 50 by the average will give the value of one unit of the test. This value is then multiplied



by the actual number of units accomplished by the person tested and the product gives the rank in terms of the average and at the same time indicates the deviation from it. The numbers secured in this way will never fall below zero, nor extend much beyond one hundred. Of course the only reason the average is set equal to 50 is one of utility. The writer has tried, 1, 50, 100 and 500. Of these 50 seemed most satisfactory. The numbers are quite small, minus quantities are eliminated and fractions may be neglected. The consideration of a concrete example will best precede the discussion of the validity or usefulness of these quantities.

[illegible]

The table records two quizzes given to a section of the class in the Introduction to Psychology. The quizzes were of the

Ebbinghaus conjectural type, in which the student is expected to supply appropriate words in the blanks which have been left in a text. Column B shows the number of students who correctly filled in the corresponding number of blanks indicated under A. Under C the products of AB are given, the sum of which indicates the total number of blanks filled in by the class. This sum is divided by the number of students and the quotient gives the average accomplishment. This average is then taken as equal to 50 and from this the value of one blank is calculated. Consider quiz I: The sum is 636; this divided by 36, the number of students, gives 17.71, the average number of blanks filled in by the class. Letting  $17.71x$  equal 50 gives  $x = 2.81$ , the value of each blank. This value is then multiplied by the actual number of blanks each student has filled in, and this gives the series under D. The values under D show the relative positions of the students in terms of the average accomplishment of the class. Algebraically the formula for these operations would be expressed by

$$R = \frac{50 nu}{\sum (uc)}$$

where R is the rank, n the number of students, u the number of units accomplished and c the number of cases.

Quizz II differed in that the number of blanks was about twice that of quiz I. In II it will be noted that one of the students has a rank of 111.5. By this method, whenever the accomplishment of a student is more than twice that of the average, this will be indicated by a rank over 100. The method proposed gives a figure which will be an index of the student's ability as compared with the average ability of the group and at the same time it takes into consideration the actual accomplishment of the individual.

The usual method of ranking is to give the best student the rank of 1, the next best the rank of 2, the third best the rank of 3, etc., increasing by steps of 1 until the poorest paper is reached which is accorded a rank of n, depending on the number of students in the class. This way of ranking does not consider the actual accomplishment. Students who have accomplished the same are ranked slightly different, merely be-

cause one of them must be first and the other last in the group. In quiz II under A the last student filled in 58 blanks, while the second last filled in 52. Under the method of ranking just mentioned, the differences of rank would be 1, while the difference in accomplishment is 6. The method proposed takes this into consideration, as will be seen in the jump from 99 to 111 under D.

The question will arise: If I and II were given to the same students, why are not the ranks the same? The difference is too large to be explained as due to the variability of the individuals. To account for this variation the quizzes were regraded in terms of 1000. If all the blanks had been properly filled in, the student's grade would have been 1000; if only half had been filled in, the grade would have been 500; etc. The average grade was then calculated. For I this was found to be 588, while that of II was 408. The average grades of the two quizzes were to each other as 1 : 1.44. This means that I was easier than II, and to fill in a certain percentage of blanks in I was not as much of an accomplishment as to fill in the same percentage of blanks in II. Quiz I was so easy that the best students could not adequately express their ability. The relative position of the students is of course unchanged, and where this is all that is desired it does not matter much which quiz is selected. However, if actual accomplishment is to be considered also, II is evidently the one nearest the maximum accomplishment of the individual students.

Column D will by mere inspection reveal the nature of the quiz or test without it being necessary to calculate standard deviations. If there are fewer students above the average than below it, the rank of those above will be relatively high. II has 18 above and 20 below. If there are more students above the average than below, the rank of those above will be relatively low. I has 19 above and 17 below. As already stated the rank will be above 100 when the accomplishment is more than twice that of the average. The rank cannot extend below 0 because it is assumed that all students who accomplish nothing are recorded as having accomplished 0. Strictly speaking this is invalid for if the test had been easier these zeros would have exhibited different degrees of ability or inability.

The method also furnishes an easy means of determining the relative difficulty of tests which are to be used as standards. Suppose it is desired to prepare a number of different tests which are to measure ability to memorize. After a number of different texts have been prepared they should be presented to a relatively large class, say not less than 60. Suppose the time required to correctly repeat the text once be taken as the basis for the ranks. In the easy texts the average time will be less than for the difficult ones, and the ranks will be grouped around 50. This inference follows logically, for if the text is so easy that every student can repeat it correctly after it has been presented to him once, the rank of all the students will be 50, since the average will be the same as the accomplishment of each student. If some parts of the text are difficult and others easy (a very undesirable condition in tests) the average time will not be so short and there will be fewer above the average than below it. This again follows logically. Suppose one-half the text is very easy and the other half very hard. Practically all the students will get the easy half in the same time. This time will be in the nature of a constant added to the time required to get the difficult part. The average will be thrown high up and there will consequently be relatively few cases above the average. If the text as a whole is difficult the range of ranks will be relatively great and since those who memorize easily will be less hampered by the added difficulty than those who have average memories, we should expect some of the ranks to be above 100.

The test as to whether two texts are equally difficult would be: first, the averages should be approximately the same, (provided, of course, the tests are divided into the same number of units); second, the distribution of the ranks should be the same. This however is not enough to determine a *fair* test, one which will test the maximum ability of the best students. In traits which appear to be distributed according to the binomial curve, a fair test might be one in which the number of cases below 25 is equal to the number of cases above 75 and the sum of these two groups is equal to the number of cases between 25 and 75. The quizzes in the table do not exhibit this kind of distribution, but the manner in which they were given would preclude this.

The time element was not considered. When a student had finished he handed in his paper, and all the papers were not called in until about three-fourths of the students had finished. Those who finished early were thus no longer participating in the test. If the quiz is so prepared that none of the students has finished when the papers are called in, or if the papers are called in when the first student has finished, the distribution of the ranks will more closely resemble the suggested proportion. Of course this proportion can only be secured when the trait is distributed in accordance with the binomial curve. The usefulness of this proportion can only be determined experimentally. As yet there is no justification for it except that of symmetry and similarity with the binomial curve. If the ranks persist in grouping themselves closely around 50, this indicates a skewed distribution. A dimorphic distribution, or one having two modes would have few ranks of 50, but they would be grouped around two numbers, one on either side of 50. The method does not give the rank 50 unless it is an actual accomplishment, nor does the type of distribution interfere with the validity of the ranks secured. The gross type of the distribution of any trait can be readily determined by inspection, at least sufficiently well for practical purposes, without plotting the curves. Of course, where the tests are to be interpreted theoretically, all the more refined mathematical aids should be used.

The reader who has followed thus far will have inferred that the method gives the same kind of a series no matter what the nature of the mental test may be. Where it is desirable to correlate different traits this can be done with the same figures. The value of the average have been so selected that all the necessary calculation for deriving the standard deviation and the Pearson coefficient of variability can be performed with the desired degree of accuracy on a 10 inch slide rule.

The personal equation of the person giving the test is practically eliminated, as are also slight variations in the difficulty of the tests. Fluctuations in the average, (where the number of units is the same) will indicate that there are gross irregularities either in the method of presentation or in the composition of the group. The distribution of the ranks and the

numerical value of the average constantly stand guard over the test. Small irregularities leave it unaffected but serious errors show up at once.

In developing this method the writer has tried to foresee the needs of future educational methods, and has tried to reduce mental measurements to terms which will be intelligible to the average school-teacher or parent who are usually unhampered by psychological training. Of what good is a report no matter how complete and trustworthy, if it requires an expert to interpret it? At present the experts are too few and the students too many to permit the most efficient co-operation between them. The method can also be applied to physical measurements, but instead of making the average the starting point the "normal" generally accepted by the medical profession would probably be better. If, then, the parent or teacher finds that the eyesight of a student is recorded as 25, this means that with respect to vision this particular student is at a disadvantage as compared with the other students. What treatment the student is to receive must be left to the oculist, but the parent should have it forcibly brought home to him that his child is at a disadvantage. The method indicates the extent of the disadvantage. If, again, the parent or teacher finds that the value of the average of all the tests, physical as well as mental, recorded of a student is 75, this tells him directly and in an unambiguous manner that the student is well fitted for what he is doing, and is doing it well. Neither the one nor the other need know anything of how such measurements are made. Rulings with respect to particular classes, say defective students, could be intelligently made and rigorously enforced. The reader will have gathered that the method is not restricted to the tests of educational psychology. The practical value of it seems greatest when applied to the routine work of the school or college.

In conclusion a few words on the validity of the group average may not be irrelevant. Suppose a significant difference is found in the averages when the same test is given to two different schools. Does it follow that the average of either the one or the other group should alone be adopted? It does not seem so to the writer. If the measurement of a child's

ability is to mean anything to the child or society, (and society for us is the group in which we live) it should be in terms of the group in which it is most likely that the child's life will be spent. In the majority of cases the group in which a child is educated is also the group in which the child will probably live. If his rank in this group is high, and if his success in after life depends on the same traits which have been measured in school, he will probably be equally successful in the estimation of his colleagues. Success is a relative term. Success to an immigrant's child means something different from what it does to the child of a professor. The student's own idea of success is much more influenced by the ideas of his associates than by the abstract principles of the moralist. The practical considerations of life demand that we know our standing in our own group, rather than what our standing would have been had conditions been different. However, it is not to the writer's liking to speculate on matters which can be much more satisfactorily determined experimentally. He doubts very much whether there will be significant differences in the averages.

For the present it seems best to start the series from the average of the particular group. As the tests become more standardized and the records accumulate, educational psychology may be able to furnish norms or constants with each test as exact as those of the oculist.

## PEDAGOGICAL PROBLEMS IN NATURE-STUDY.

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The problems in teaching Nature-Study are the same as those of education in general, though, perhaps, they present a somewhat special phase.

Assuming the pupil to be the basis of determination, the two chief questions in Nature-Study are: What kind of subject-matter shall be presented? and How shall the instruction be given?

The selection of subject-matter should be largely determined by the nature interests of the pupils. But what are those interests? We think we know, and we even think we know the things which the child likes best. We say he is most interested in animals, least in inanimate nature; that primary pupils are more interested in habits than structure study; that the older pupils show greater interest in the economic aspect of nature; that children like flowers and butterflies, but dislike snakes and spiders.

These conclusions are for the most part the result of teaching experience, and are expressed as general judgments which we find difficult to analyze and to vouch for with statistical evidence. Some such judgments are merely "pious opinions," but have governed the construction of courses of study for years. It would seem that this question of interest were susceptible of experimental analysis. We have some data of observations of likes and dislikes and fear as regards nature objects or phenomena. But they are not quantitative.

The questionnaire method has been employed in other subjects to study the question of pupils' interests. Very instructive results should be obtained for Nature-Study by this method applied in different grades and in various environments.



Personally, I am inclined to be skeptical of the value of the results of questionnaires on interest as a basis of selecting a course of study. I admit the results would be interesting and profitable, nevertheless.

It is extremely difficult to word a questionnaire so that children will grasp the meaning uniformly. It is not always possible to catch the children off their guard, and they will answer the way they think you want them to. Even granted that the questions are understood and the answers sincere, there is another fatal difficulty of not being able to distinguish between instinctive and acquired interests, permanent and temporary interests. My point is illustrated by the results obtained in such a study in geography. In the 80's Monroe and others sent out a great number of questionnaires to various grades in different communities, asking what place the pupil would like to visit, and why. The results were vitiated somewhat by the use of the word "place," which to most of the children evidently meant "city," and they answered accordingly. A more inclusive term or expression should have been employed, embracing land and water forms, aside from cities. The summary of this study showed an overwhelming preference for human activities, and teachers were urged, therefore, to place the emphasis on political geography instead of physical and mathematical, and textbooks and courses were adapted accordingly. A traditional question in teachers' examinations still is: "Which is of more interest to children, physical or human geography?" It should be noted that up to the time of the above questionnaire very little real physical geography had been taught either in the elementary or the high school, and that teachers were generally ignorant of physical geography.

In 1907 Gibb made a similar study of children's geographical interests, using a better-worded questionnaire. His results are quite different from those of Monroe and others of 20 years ago. He finds a far greater interest in physical geography than was generally accepted, though he finds the human aspect of first rank. This surprisingly greater interest in physical features I ascribe to the fact that for the last decade or so vastly much more physical geography was taught in the

elementary schools, and teachers had learned more about it than before. The point is, we may, to a large extent, develop a real or artificial interest in pupils by teaching along the lines of such interest. The mind grows with that upon which it feeds; in fact, becomes like it.

The question arises: Do not the trend of teaching, the effect of environment and the spirit of the age mold pupils' interests? Do not these interests change as times and educational manners change? Is there any permanent interest? If so, how may it be analyzed?

The above criticisms of the questionnaire method is made as a warning, not against the method, but against certain conditions that must be guarded against or taken into account.

The usual method of presenting nature lessons is by the development method. This method may be ideally a fine one. There are, however, prominent educators who object to it as a waste of time. It is interesting to note that in learning practical shop work or other occupations, the method of instruction is not that of discovering for one's self, but dogmatic, positive direction, or example and imitation.

It should be possible to make some comparative study of the method of eliciting and the method of direct instruction. The problem is a complex one, but it would be worth while discovering whether the book method is as black as it is painted or the development method in the hands of the average teacher any better.

For such a comparative study there should be parallel classes, one class studying by one, and another by the other method, both studying the same topics. Various tests should be made to determine the relative efficiencies of the pupils. The simplest test would be a memory test. Examine the pupils without review in the recognition of the objects studied—birds, insects, flowers, etc. Another memory test showing greater knowledge would be to require the descriptions of appearances and habits of the creatures taken up in the course. A similar test, somewhat less useful on account of varying drawing ability, would be rough sketches of the things studied.

A mere memory test is not sufficient to judge a pupil. Many who get excellent marks in examinations are inefficient in prac-

tice. Tests should be devised to test the application made of the pupil's knowledge. For example, taking care of pets and plants, etc., caring for an aquarium, caring for apparatus, as a doorbell, might be used for such a test. This would be superior to a mere memory test. The school garden might be used to rate the pupils' efficiency, the condition and size of the crop being the index. Of course, allowance must be made in such practical tests for conditions not under the pupils' control.

Another test of the comparative value of methods of instruction would be the initiative shown by the pupil in applying school-gained knowledge outside of school, as in constructing apparatus, experimenting, keeping pets, making a garden, visiting parks, museums, and industrial plants, and walks in the country. This would be a difficult thing to observe and rate, yet would show how deeply the school work had penetrated the pupils' nature.

Still another test might be made of the pupils' ability to attack and solve simple nature problems, based upon the work previously taken. That is, this would be a test of the pupils' "scientific method."

Mere memory tests, such as naming and describing, are insufficient to test the real value of instruction. The test should show whether the knowledge gained is organized and usable, and whether the pupils' views and modes of thinking have been improved.

As a rule, no tests are given in Nature-Study. Hence we have very little real knowledge of the value of the work in this subject. For the sake of determining general principles, at least, some such tests should be made.

There is one method of instruction used in Nature-Study, and also in geography, which ought to be capable of experimental study. That is the practice of requiring pupils to draw the things studied—structure of plants and animals, apparatus, maps. The ground on which this is based is the general belief that by drawing the thing the pupil observes the details of form, structure, parts and their relations more thoroughly, and therefore gets a better idea of it, and, furthermore, retains it longer by the aid of "eye-memory."

This question is really more important in geography than

in Nature-Study, owing to much drawing of maps. Experiments should be made testing the value of pupils drawing their own maps as compared with the map knowledge they would gain from simply studying the maps in their books, the wall map and filling in printed outline maps. There is probably no doubt that practicing drawing a map will result in a better memory sketch. But the important question is whether the pupil without the drawing, but with equally detailed study of a map or object, could not recognize it as readily or have as good an image of it as if he first drew it. If so, much of the drawing now practiced is useless. I recently required my classes to draw and color the map of New York City, using a printed outline map as a basis. The next day I asked the students to trace the outline of the city on a large map of the vicinity. The results were surprising and discouraging. Very many had only the vaguest sort of notion of the boundaries of their own city, leaving out Staten Island, taking in Jersey City, including parts of Westchester county, omitting parts of Queens Borough, etc. The drawing of the map the previous day had borne no fruit. It was evidently only mechanically done. If such is the result with students of this grade, what is the value of map-drawing, plant-sketching, drawing of apparatus, etc., in the elementary school?

A very simple experimental study could be made of this problem. Take a few not too simple, meaningless diagrams or characters which are not too easy to distinguish. Let one class study them for a certain time, the teacher calling attention to details of structure, each character being called by a letter or number. Afterwards, perhaps the next day, hold up one of the characters, asking for its name or number, test the pupils' ability to recognize. In another class let the pupils be required to draw each character accurately, and test as in the last case. The result should show the relative merits of mere observation and observation and drawing.

## COMMUNICATIONS AND DISCUSSIONS.

### THE STUDY OF EDUCATION.

I do not for the sake of controversy desire to take issue with the surprisingly abandoned tirade of Mr. Warner Fite, published in *The Nation* September 1, 1911. I am well aware that there is some truth in some of his insinuations, yet I am equally certain that the tone of the communication is not conducive to a clear appraisal of the present situation in regard to the administrative and educational problems involved in the training of teachers for a State school system.

In the interests of fairness the writer feels that Mr. Fite's constructive suggestion should be disentangled from the innuendoes of his preface. These are so obviously absurd that the force of the final suggestion is lost.

We have in this country approximately 300 departments of education in colleges and universities and about 275 in normal schools. College presidents trained in the traditional academic branches, and their legislative faculties with the same training, have evolved our present programs of courses and curriculums. This present "deplorable" situation, tainted with pedagogy, is their work. The professors of education are also their products. The superficiality of college work and the absence of the old-time impelling cultural and scholastic ideals, in so far as this is an actual modern backsliding movement, and not a natural confusion due to changed industrial relationships, responsibilities and duties, must be traced to a more profound interplay of social forces than the literal one of unwary college scholars allowing pedagogical black sheep to slip into their pure and undefiled folds. The writer has been connected, as student or teacher, with one normal school, one New England college, Harvard University, and three State universities, and he has not been struck with the fact that teachers of educational subjects are, in endowment or ideals, so out of their element as Mr. Fite would have us suppose.

Now, for the superfluous and weakening innuendoes of our author. The trite allusion to modern sophists and to the Protagorean claims by professors of education of "exuding" a specific quality is somewhat worn, and may be dismissed as the author's prefatory rhetoric. Mr. Fite, I am told, is a professional, possibly a peripatetic, philosopher. This must account for his next naive assumption that school legislation (and he refers to high-school legislation), bad enough we all grant, is produced by the professors of pedagogy. The average citizen knows better. As to the next charge, that university study of education attracts to the university an undesirable grade of student, one can only say that college departments do not leave to professors of education the entrance standards nor the quality standards for continued college connections. The responsibility is not upon them. The grade of student, received or made, is just one of those delicately complex affairs on which only our philosopher can with assurance construct his premises and glide to his conclusions. And so his preface (which is all of his article but the concluding paragraph) runs. The main course, the stock course in education departments, is "management," the scholarly contributions of the professors are *nil*, the literature banal and inane, the courses "snaps," the teaching the poorest to be found in colleges. Then follows from the professor of philosophy (which means, we suppose, logic also) an analogy. The professor of pedagogy is allowed to diagnose "laziness" as he draws from his basal science of psychology. This is amusing enough and about as absurd as the analogy, which the author omits, of the old family physician diagnosing "sickliness" in Johnny, and it illustrates about as much. More amusing to the critical reader must be his next step, that of himself proposing the *correct pedagogical treatment*.

Our author next wades characteristically into the field of the subject-matter of educational study, first finding no distinctive subject-matter in educational psychology, forgetting that James, whom he quotes misleadingly, wrote a book on the subject himself, overlooking Ribot, Sanford, Meumann, Whipple, Thorndike and the rest, as well as contributors to important foreign and American journals. He makes a wild statement about the large Herbartian following in psychology, which I find from an examination of the work at Harvard, Columbia, Michigan, Wisconsin, Illinois, Texas, California and Missouri to be strikingly in opposition to the whole type of emphasis.

In regard to the training of the professors in Education, I find that in these eight institutions the instructional staff in 1907 included 28 Ph.D. men, as against 4 for 1897 when Education courses were given by the department of philosophy, toward whom Mr. Fite evidently thinks these professors have become ungrateful offspring. These Ph.D. men may be "mill products," as Mr. Fite suggests. The majority of them happen to have been turned out by large philosophical departments. I may add that now graduate students of Education are supplementing their educational training largely by taking minors in economics, sociology, history, political science and psychology.

The author gets deeper into his own muddle when he attempts to caricature experiments in educational psychology, happening to cite experiments which were carried on in what he would call laboratories of pure psychology. In fact, studies in attention, imagery, in memory processes simply, in individual differences, in learning, in skill acquisitions of all sorts, in habit forming and breaking, and even in the ordinary thinking processes, all pedagogical problems, are becoming increasingly popular with all psychologists. In lamenting the fact that educational treatises on formal discipline have failed to see the crucial point of the controversy, he appears not to realize that Munsterberg's most recent pedagogical book, "Psychology and the Teacher," and monographs by Meumann, Colvin, Judd and others have clearly stated and elaborated the relation of the problem to "conceptual activities." He fails to concede that educational psychology with reference to this one question in general points toward the possibility of transfer of training, and that it alone has launched an era in experimentation, especially under actual schoolroom conditions, and has enormously stimulated in teachers an inquiry into and a professional desire to possess scientifically grounded educational convictions. Laymen refer to the first experiment of Thorndike and Woodworth with surprising ignorance of the general character of later experimentation. Mr. Paul Shorey (in the *School Review*, November, 1910), whose chief contention is in the main correct, shows the same lack of information in this particular. Psycho-physics has not succeeded in rendering the service mentioned above.

But surely Mr. Fite can no longer be taken seriously when he continues with statements to the effect that there is little of the history

of education which is related to our schools, and that there is no practical value in Plato's "Republic" or in a knowledge of the evolution of universities! A hint of the purport of the article comes when we are told that philosophy of education duplicates other departments (philosophy?). Even in 1897 philosophical departments did perfunctorily the Education work in half the institutions named above and practically controlled the others. In 1907 Education had become in all of them at least co-ordinate with any department in the arts faculty. Further, we are told that without a conscious and specific study of the field of education college students will unconsciously adapt their educational philosophy, accidentally their technique, and (presumably) do without a knowledge of administrative, social and specific economic problems. As well say that Plato, or Aristotle, or Rousseau, or Herbart, or Locke, or Spencer, or Eliot need not systematically articulate educational principles, as the common run of us will somehow get along. But—and here our author concludes his preface—if we give these courses, give them incidentally through departments of sociology, psychology and ethics. That is, for example, let Mr. Fite remark or write incidentally upon them. This is the method, now superseded forever, by which, in quite recent educational history, philosophical departments sought to deal with both sociological and educational subject-matter.

Now for the constructive program of the author himself, after having told us that "college pedagogy is unfamiliar with any noble ideas." It is this: Education is "a subject whose problems are so complex and so broadly involved in all the problems of social order, of civilization and of life itself \* \* \*" that we should hold it off for the graduate school—not broach it to any undergraduates, practically all of whom in nearly every State must teach before they can afford to pursue graduate work. How would this definition and this policy do for philosophy? Why not?

The fact is, indeed, that we have absurd school laws, petty school regulations, inadequate and temporizing certificate regulations for public-school teachers, and often quite inadequately equipped departments of education as well as of psychology or of any other broad branch of human interest. But we also have rather pervasive social forces, which, very much alive still, have brought all these things about, and which will bring to all of them increasing efficiency. We must, even the philosophers, be philosophic and constructive in our



attitude and practical in our specific remedies. We cannot simply kick inevitably slow developments out of the road because we wish to pass undisturbed.

I do not sympathize with Mr. Fite's emotional attitude in the matter any more than I do with his ungrounded, or partially ungrounded, prejudices and assumptions. I do recognize, however, that he voices an existing sentiment. College men in faculty relations are unfortunately often quite as petty and selfish as other organized groups of institutional workers, and a newcomer into the ranks catches it on all sides. The classicists have not yet overcome their prejudice against the scientists. History and political science, and later economics and sociology, met their unwelcome reception. All these are now less acute, partly because the newest entrant into scholastic (or scholarly?) ranks is making headway, and has at every turn urgent and interesting problems which will increasingly appeal to those whose choice of a profession is teaching in a public democratic system of schools.

Education is in a sense a "tariff-protected" part of college work, but so is psychology in every one of the same institutions but one, where education is on the same footing. This has been so for a long time. Further than this, law, medicine and pharmacy are also "protected" in the same sense. Many still think that we should protect the lawyers, physicians and pharmacists from those who wish, uncertified by law, to practice these professions. All these regulations for minimum standards are in process of evolution and of refinement of tests for efficiency. They all require, or desire to require, fundamental intellectual training as well as specific information about matters of technique, professional conscience and social efficiency. The analogous conception of teaching as a dignified profession throughout its ranks is just becoming articulate. No one realizes more sensitively than the writer that we are scarcely touching the problem of an organized attack, much less the solution of the problem. All educational institutions, including the Carnegie Foundation for Teaching, are jumping into the fray. Mr. Fite's simple proposal for ejecting the latter-day sophists is more like that of Aristophanes than that of Socrates. Moreover, scholars assure us that Plato himself in his "Protagoras" was possibly one part Socrates and one part Protagoras. In any case, education is here to stay. Its courses in the eight institutions above referred to increased from 85

in 1897 to 182 in 1907, in graduate work from 27 to 64, and its instructional staff from 14 occupants with no specific preparation to 47 with, in most cases, the highest insignia of scholarship these universities award. Scientific contributions, literature purged of the inane and banal, methods and system proportionate to the vitality and pervasive relationships of its complex, modern problems, and acquiescence by college colleagues in supporting this added function of higher educational service will come as rapidly as the slow movement of social control allows and demands.

I have more elaborate statistics gathered from a critical study of 80 catalogues of the above representative institutions, supplemented by correspondence, and in most cases observations on the ground. I am content, however, for the present if I have succeeded in opening the question so neatly closed by our author.

In reply to Mr. Fite's indiscriminate attack upon the staffs of 300 college departments of education and of 275 in normal schools in the United States alone, I feel that his simple solution of the problem of teacher training merits William James' characterization of such philosophy:

"The world to which your philosophy professor introduces you is simple, clean and noble. The contradictions of real life are absent from it. Its architecture is classic. Principles of reason trace its outlines, logical necessities cement its parts. Purity and dignity are what it most expresses. It is a kind of marble temple shining on a hill.

"In point of fact it is far less an account of this actual world than a clear addition built upon it—a classic sanctuary in which the rationalist fancy may take refuge from the intolerably confused and gothic character which mere facts present. It is no explanation of our concrete universe; it is another thing altogether, a substitute for it, a remedy, a way of escape."

CHARLES HUGHES JOHNSTON.

University of Kansas.

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#### THE LEFT-HANDED CHILD.

My attention has been called to a case of left-handedness in a boy about eight years old and in the third grade. His teacher tried to

compel him to use his right hand in various school exercises, with the result, apparently, that a speech defect nearly equivalent to stammering appeared. Though the literature on right and left-handedness, so far as a hasty examination of it has gone, does not treat at any length of this phenomenon, inquiry has revealed other somewhat analogous cases. Prof. W. H. Burnham, for example, has called my attention to a case, reported by E. B. McCready, of a little girl whose development seemed normal until about a year and a half old, when an attempt to correct her left-handedness resulted in her ceasing to talk. After a week or two of special training, with liberty to use her left hand freely, she began to speak again. Another case cited by a recent writer concerns a young man of 20, afflicted with word-blindness and stuttering, who was cured by reversing his "hand."

The problem here presented is of so much practical as well as theoretical interest that I venture to solicit assistance from those who are dealing with it. I shall be glad to receive information from readers who have noted attempts to correct left-handedness, whether the outcome was successful or unsuccessful. Instances of concomitant speech disturbance would be of particular interest.

GUY MONTROSE WHIPPLE.

Cornell University.

## ABSTRACTS AND REVIEWS.

GABRIELE GRAEFIN VON WARTENSLEBEN. *Beiträge zur Psychologie des Uebersetzens*. Zeitschrift für Psychologie, Bd. 57, H. 1 u. 2, pp. 89-115.

This monograph reports the results of an investigation conducted in Marbe's institute at Frankfurt. Fifty Latin words and fifty Latin sentences, so arranged that each word or sentence easily translatable was followed by one difficult to translate, were placed before the observers, who were instructed to read each word or sentence rapidly to themselves, to translate it as quickly as possible into German, and immediately after translation to report the experience that intervened between the reading and the expression.

The following conclusions are drawn by the author from the introspective protocols: (1) Ideas, feelings and different types of *Bewusstseinslagen* may occupy this interval. Of the *Bewusstseinslagen*, those of "meaning" (*Bedeutung*) and "familiarity" (*Bekanntheit*) are particularly important. (2) The consciousness of the German equivalent may come prior to its expression or simultaneously with the expression; in many cases, the conscious incidence of the German equivalent occurs partly before speaking the word, and partly simultaneously with the expression. (3) Either acoustic ideas or motor reactions were reported by all of the observers, while visual ideas were lacking almost completely in five out of the six. (4) The *Bewusstseinslage* of meaning may appear during the reading of the Latin word, between the reading of the Latin word and the incidence of the German equivalent, and even during and after the incidence of the German equivalent. It may appear either in combination with other conscious contents, or independently. (5) The same rule holds in connection with the appearance of *Bewusstseinlagen* of recognition or familiarity. (6) In translating sentences, a difference was noted between the *Bewusstseinslagen* of the meaning of isolated words and the *Bewusstseinslagen* of the meaning of words in syntactical connections. (7) In addition to the indirect translation,—in which "accompanying" or "intruding" conscious processes intervene between the

reading of the Latin word and the expression of its German equivalent,—there are instances of direct translations in which the protocols show no intervening conscious processes. (8) With increasing readiness of the associations, the intervening conscious processes become fewer in number, and the translation approximates the direct or immediate type. But while the “conscious” processes decrease with this increase in readiness of associations, the *Bewusstseinslagen* both of meaning and of familiarity tend to increase. W. C. B.

FREDERIC LYMAN WELLS, PH.D. *Practice Effects in Free Association*. *American Journal of Psychology*, 22; January, 1911, 1-13.

This is perhaps the first attempt to study systematically the effect of practice upon the stock association experiment. One thousand different stimulus words were divided into 20 series of 50 words each. Six observers reacted to one series each per day, and the first two series were given again at the end of this period. The times were taken with a stop-watch and recorded in fifths of a second.

On the quantitative side, the average speed of reaction was reduced during the 20 days for the slower reactors quite appreciably; for the faster reactors, much less so. The general tendency is, then, toward the canceling of individual differences. On the twentieth day, in other words, all the observers seem to be reacting at a certain psychological limit of quickness (7 to 10 fifths of a second), which is approximately the same for them all. (The initial quickness ranged from 7 to some 16 fifths of a second.) Now the interesting thing about this reduction is that there was no repetition of a stimulus word during the 20 days, so that the practice-effect cannot be due to the retraversing of specific association paths. To make this clearer, Wells added subsidiary tests of practice in addition and in the cancellation test, in which, he asserts, the resulting practice-effect is “of the same order of magnitude”—a statement that does not, however, seem to be borne out very clearly by the numerical results. Be this as it may, Wells is doubtless right in concluding that the practice in the association test operated to remove certain inhibitory attitudes, *e. g.*, to bring about greater accustomedness to the experimental conditions, less liability to distraction, etc. In short, practice eliminates the unessential. It is worth while pointing out that this is substantially the conclusion reached by Whipple and by Foster in their studies of the effects of practice on visual

apprehension and on the production of visual impressions (this JOURNAL, May, 1910, and January, 1911).

On the qualitative side, practice operates "to further differentiate and particularize the responses by increasing the readiness with which the subject's entire vocabulary becomes available for the purpose of such response," to render the responses more superficial and to decrease the emotive value of the experiment.

C. J. ROGERS.

W. A. LAY. *Die Tatschule. Eine natur- und kulturgemässe Schulreform.* Leipzig: A. W. Zickfeldt, 1911. Pp. xi, 227.

"Die Tatschule" is one of a number of books that have appeared in recent years expressing great dissatisfaction with present-day educational methods and practices and suggesting a new program for the future.

The book deals largely with the educational situation in Germany today. It is characterized as one of fermentation. Uncertainty, restlessness and varied innumerable struggles for reform show themselves everywhere. More and more the schools are being subjected to a caustic criticism by the public. This censure is based on indisputable facts. Illness in the second school year is twice as prevalent as in the first year. In the higher school 70 per cent. of the pupils are affected. The growth in the height and weight of children in school is below that of children who do not attend. Myopia, stuttering and unfitness for military duty increase in proportion to the number of years spent in school. The large number of suicides of school pupils does not suggest a healthy and happy condition of the pupil mind. The barren results of the best methods of teaching and the inability often of those trained in the schools to apply that training in life—all such facts lead to a definite conclusion: the new age demands a new kind of school. There is need of a unified point of view and co-operative effort.

Dr. Lay believes that the causes of the inefficiency of the schools are to be found in the instruction and organization of the schools. Both are opposed to life instead of being in harmony with it. The child physiologically and psychologically is intended for action. He is literally driven to action by the various stimuli that play upon him. His self-instruction in play is through free activity, usually in some kind of social group. On entering school all this is changed. The

child enters a realm remote from an intelligent sympathy for childhood. Activity and keenness of interest and perception die a painful death. The child is cramped into a seat and is forced to learn words. The *Sitzschule* and *Wortschule*, unnatural, unhealthful and fatal to the development of broad, human interests, reign. Play life, with its opportunity for initiative, leadership and many-sided activities, gives way to an absolute monarchy in which the teacher is supreme. The author says that it is not to be wondered at that some of the world's famous men as schoolboys were misunderstood and pronounced dull.

The author believes that the secret of instruction, interest and attention lies in activity. (P. 77.) While he believes that the introduction of manual arts into the schools is a step in the right direction, it does not solve the great problem. He shows how fundamental activity is in the getting of clear ideas, and maintains that the *principle of activity* should underlie every phase of school work. This activity should always be closely associated with perception and the thought processes. This means that the teacher should make a special study of native reactions in order to direct them according to the ideals of education. He believes that children should work in groups. The teacher is not to act as a policeman, but, as far as possible, is to become a natural member of the group. Education for life through life will then be possible.

The author does not aim to give a systematic and complete plan for school reform, but rather to state principles. His book shows a comprehensive study of educational literature. He believes that the problems of education are to be solved in the clear light of science, and not in the twilight of emotionalism. Throughout the book he shows the need for experimental pedagogy and investigation.

Dr. Lay has written with clearness and vigor. He has avoided the platitudes so current in our educational literature of today. His book is destined to promote much valuable discussion and thinking.

J. MACE ANDRESS.

State Normal School, Worcester, Mass.

JOHANNES LANGERMANN. *Der Erziehungsstaat nach Stein-Fichte-schen Grundsätzen, in einer Hilfsschule durchgeführt.* Berlin-Zehlendorf: Mathild Zimmer-Haus, G.m.b.H. Verlagsabteilung, 1910. Pp. 67.

Johannes Langermann's educational doctrine is an additional voice in a long series of emphatic protests from Comenius to John Dewey against the deadening formalism of current educational practice. In genuine Pestalozzian spirit, he bemoans the gulf dividing master and pupil as an inevitable result of motiveless instruction. The lack of motive is held responsible for the present inert condition of formal education.

In the light of this indictment, Langermann's ardent plea for a volitional pedagogy, based on the vital needs of the unfolding mind, is well founded, and deserves the strongest endorsement. Needs are discerned best through natural, spontaneous activity, such as is conspicuously lacking in the present-day system of education. The establishment of a school garden, in which activity, not passivity, reigns, gives abundant opportunity to discover such needs as are essential to successful social life. Here is found the nucleus of a self-governing state, based on deeds, health and personality. Actions constitute the great desideratum, and rightly so.

It is worthy of mention that the garden, with its activities, constitutes an effective means to secure motives of conduct. Development of strong, independent, individual *wills* is the immediate end. Each act of will to be effective in character formation, must be a response to a real, immediately present motive. The sum of these *wills* combines to form a general *will*, which acts under a general motive.

The volitional notions of Stern and Fichte, in spite of their metaphysical character, are carried here, through keen observation and thorough organization, to a convincing conclusion. The spirit of Pestalozzi tempered with sound psychology and a sense for organization is throughout apparent.

Theoretically, and as an experiment, Langermann's system gives every evidence of success, but its general applicability is open to serious question. A serious practical difficulty confronts any attempt to motive all the various subjects of the curriculum, especially in the higher grades and secondary schools. Moreover, it does not seem



advisable to regard technic and factual instruction as incidental to volitional activity. Throughout the pamphlet one feels the force of John Dewey's dictum: "School is Life, not a preparation for Life."

G. F. ARPS.

University of Illinois.

JOHN ADAMS, M.A., B.S.C., Professor of Education in the University of London. *Exposition and Illustration in Teaching*. New York: The Macmillan Company, 1910. Pp. 416. \$1.25 net.

Certain types of teaching culminate in the developing of ideas, while others have their issue in habit-formation. Professor Adams, in his recent book on exposition and illustration, is dealing entirely with aspects of the former field. To one who has enjoyed the wit and sprightliness of his book on "Hebartian Psychology Applied to Education," the present volume may prove somewhat of a disappointment. The attempt to mass all possible suggestions bearing on the subject has made the book slightly heavy. Nevertheless, the real gift of the author as a writer has made it readable, and often entertaining.

The pedagogue has now for some time, whether a "Herbartian" or not, come to recognize that teaching must provide for certain mental processes, call them by whatever name he will. If he hopes through Professor Adams' book to place exactly, in a formal way, just where exposition and illustration belong to a scheme for imparting knowledge, he will be disappointed. No teacher who has an interest in his work, however, can fail to find some very important suggestions which are sure not only to enlarge his experience, but will help him to evaluate his experience as well. Whatever may be said of the psychological overlapping of explanation, demonstration, explanatory illustration and "anticipatory" illustration, the distinction is bound to result in material help to the practical teacher.

In the first third of the book the author explains his terms and his point of view. His chapters on "The Mental Background" and "Suggestion" are among the best in his book, while his chapters on "Combination" and "Presentation" show his "Herbartian" principles. The succeeding chapters are not closely related to these, although Chapters VII, VIII, IX and XI are evidently intended to correspond loosely with subdivisions outlined in Chapter VI. The chapter on "Order of Presentation" and "Exemplification and

Analogy" and those on "Illustration" and on the "Diagram" draw on a rich experience, and offer valuable contributions to pedagogical literature.

On the whole, the book deals with so important a field of education in so effective a way that it should be read by every student of methods of teaching, and anyone else interested in getting the greatest possible number of practical hints for imparting knowledge to others. It is none the less instructive because the field of illustration is so clearly English. It is equipped with a good index.

STUART H. ROWE.

Wadleigh High School, New York City.

HENRI BERGSON. *Creative Evolution*. Authorized translation by Arthur Mitchell, Ph.D. New York: Henry Holt & Co., 1911. Pp. vi, 407.

English readers will be delighted to have this much-talked-of book in translation. Bergson is original, stimulating, refreshing, and represents, withal, a type of thought now in the ascendant.

In Bergson's philosophy we have the metaphysical first fruits of the biological age in which we of the twentieth century are living. We have here a reaction against all the last century philosophies which treat the physical sciences as if they represent the last word of truth, and either like Spencer build their systems upon these sciences, or else like Comte doubt whether it is possible to transcend them. Now we have a philosophy of *life*, in which life is loosed from all its physico-chemical limitations and shown to be reality itself. It is only that which *endures*, which flows, which creates, that is *real*. Such is *life*, or, going still deeper, *consciousness*, a self-creative, unforeknowable stream.

Over and over again Bergson points out the limitations of the intellect in dealing with reality. It gives us only an artificial aspect of things as they are cut out by our perceptive powers. Hence equally false is the metaphysical dogmatism "which has erected into an absolute the factitious unity of science" and the skepticism or relativism "that universalizes and extends to all the results of science the artificial character of some among them."

Bergson's treatment of instinct will be of interest to educators. Instinct is neither "lapsed intelligence" nor is it a series of accidental variations preserved by natural selection. It is a different

*kind* of knowledge. The original "vital impulse," forging its way through inert or recalcitrant matter, takes divergent paths and arrives at last at its thus far two highest manifestations, instinct and intelligence, the former perfected in the hymenoptera, bees, ants and wasps; the latter in man. Instinct is the direct knowledge of things; intelligence, the knowledge of forms and relations. Instinct is intuition, sympathy, "divining sympathy." "The intellect is characterized by a natural inability to comprehend life." In the geometrical sciences it is powerful. All that is vital, fluid, progressive, eludes it. Hence the bungling work it makes of such sciences as pedagogy and hygiene. "Instinct, on the contrary, is moulded on the very form of life." "If the consciousness which slumbers in it should awake, it would give up to us the most intimate secrets of life."

And yet, after all, consciousness does not find its highest issue in instinct. By no means. Only in man, who differs from the animal not in degree, but in kind; who occupies a privileged place among conscious beings; who, in a certain sense, is the reason for the existence of life on the planet, does the supra-consciousness that is at the origin of life become conscious which is manifest to itself, active and free. Nevertheless, consciousness as it is in man is maimed, incomplete. It has risen to its high estate only by the sacrifice of intuition, which goes in the very direction of life. We have not, indeed, lost all of this. Vague and discontinuous as it is, still it alone can pierce the darkness of the night in which the intellect leaves us.

The graceful and idiomatic form of the translation which Dr. Mitchell has given us increases our obligation to him.

G. T. W. PATRICK.

University of Iowa.

WILLIAM DEWITT HYDE. *Self-Measurement*. New York: B. W. Huebsch, 1908. Pp. 74.

This booklet, which appeared three years ago, deserves to be mentioned in these columns because it is an unique treatment of a very popular and effective mental and moral inventory. No young person can read it without being thrown into a very helpful attitude of self-examination. It furnishes a most effective exercise in a practical ethics class if the scheme of measurement is mimeographed and given out and the teacher reads the directions from the book.

C. E. S.

JOSEPH JASTROW. *The Qualities of Men*. Boston: Houghton-Mifflin Company, 1910. Pp. 183. Pr. \$1.

"The purpose of my ambitious venture is to survey the varieties of human quality, and to do this dominantly in a practical vein; to gauge the measure and note the manner of distinctive inequalities; to distinguish and portray their several influences in the careers of men; then, more critically, to appraise their worth, to observe the success which attends them, and, if fortune favor, to reach some insight into the play of personal forces that shape our fate individually, collectively, nationally."

From the point of view of style and literary effect, the author rightly speaks of this essay as a symphony. The play of words and imagery carries in a peculiarly artistic way, but the very symphonic effect of the rich variations in the development of the theme sometimes tends to conceal that keen and practical psychological appreciation or interpretation which constitutes the successive motifs in "symphony." There is a peculiarly realistic touch in the style which made the reviewer, who is not an audile, hear the author in the most realistic auditory imagery throughout the reading of the book, although the actual suggestion of the word symphony does not occur until near the end. The book is delightful to read, and contains many educational principles.

C. E. S.

LUTHER A. WEIGLE. *The Pupil and the Teacher*. Philadelphia: Lutheran Publication Society, 1911. Pp. 217. Price, paper cover, 35 cents; cloth, 50 cents.

Of the applications of psychology to the Sunday-school problem, this is the most successful the reviewer has ever seen. The author has here brought together the very essence of psychological doctrine which may have a bearing upon the Sunday-school problem. The style is forceful, direct and personal. The material is chosen with extraordinarily good judgment, both from the point of view of psychology and from the point of view of the purpose of the Sunday-school. It gives us a clear elementary survey of the nature of the child, the adolescent, the fundamental principles of learning and action, and the nature of the moral and religious consciousness, and outlines in detail the methods of teaching which are based upon these psychological facts. The book is non-sectarian, a clear-cut treatise on educational psychology, which is destined to be of great and long continued service on account of the eminently true, prac-

tical and illuminating treatment. The publishers deserve special commendation for placing this well-printed book, which would ordinarily sell for \$1, upon the market for half that price or less. This will aid much in its spread among Sunday-school workers.

C. E. S.

D. LEVI ALVARES. *Education des Femmes*. Paris: Librairie Leopold Cerf, 1909. Pp. 360. 5 fr.

This book is a collection of biography, lectures, reports, articles and letters written by different individuals concerning D. Levi Alvares and his educational theory.

D. Levi Alvares (1794-1870) lived at a time when education for women was much at fault. In 1820 he founded a "Cours d'Education Maternelle," believing this the only true way of educating girls. The instruction was first begun in Paris. The course consisted of a thorough plan of all the common branches, each study outlined in detail, including fable reading and a style in writing. The same plan of study was followed throughout the preparatory, elementary and secondary courses. His motto was "Truths, comparison of truths, mental conclusions which philosophize these truths; that is to say, to see, to compare, to judge, that is nature's way." Later girls of this training were placed in different towns throughout France as teachers for other girls. The teaching aimed at drawing the child-mind from the known to the unknown; from the concrete to the abstract. The basis of all study was the mother tongue and history.

MYRTA G. WEST.

University of Iowa.

W. M. BECHTEREW. *La Suggestion et son rôle dans la vie sociale*. Paris: Ch. Boulangé, 1910. Pp. 276. Translated from the Russian by Dr. P. Keraval.

The author discusses the nature and mechanism of suggestion, persuasion, suggestion in hypnotism and in the waking state, involuntary and reciprocal suggestion, the action of faith, collective illusions and hallucinations, auto-suggestion, epidemics of various kinds and the significance of suggestion to society.

Suggestion is defined as the introduction directly into the mind of another, largely by words and gestures, of ideas, sentiments, emo-

tions, or of any psycho-physical state, without the knowledge of the person and without arousing his critical judgment. The essence of suggestion is the "rapport" of the suggested ideas or attitudes with the personality of the subject at the moment he receives and accepts the suggestion. Sentiments, superstitions, prejudices, penchants, ideas and, especially, personal characteristics, come to be alike in persons who are much together. Such resemblances are due mainly to psychical assimilation by way of mutual suggestion. Pathological states are likewise contagious, and are transmitted psychically. We need not, however, assume telepathic transmission. The avenue is through unrecognized channels of the senses.

The practical significance of suggestion is, according to Bechterew, of the utmost importance for the development of society. It plays a cardinal rôle both in the life and education of the individual and in the history of nations. The historian or the sociologist who ignores this fact has but an incomplete and inaccurate conception of the situation.

On the one hand, suggestion is a mental bacillus whose effects are most baneful and pernicious, and to counteract which we must strive to inoculate society with a protective vaccine. This dangerous and powerful bacillus is a causal agency in the production of great social upheavals, of religious, financial and similar epidemics. Fanatical persecutions, outbreaks of crime, the bestiality of the mob—all are instances of deplorable mental contagion.

On the other hand, suggestion, as history shows, may arouse people to great thoughts and noble acts. It is not too much to say that many great historical achievements would have been impossible without suggestion and auto-suggestion. Leaders are often the very embodiment of the life and will of the people whom they serve, and at the same time suggestion provides orators, political and religious leaders with a most powerful weapon for the accomplishment of their aims. So to use suggestion as to avoid the ill-effects to which it is prone, but to secure the good effects which it may afford—to make it, in other words, an ally rather than an enemy of social progress—is one of the great tasks of education.

A. S. EDWARDS.

Cornell University.

A. FRIEDLANDER. *Hysteria and Modern Psychoanalysis*. The Journal of Abnormal Psychology, V, 6. Pp. 297-319.

This is a critical survey, the results of which the author summarizes as follows:

1. We do not possess a therapy equally applicable in all cases of hysteria.

2. The cathartic method of Breuer and Freud has, from the theoretical standpoint, been very fruitful for the psychology of hysteria; it is of practical value in certain cases of traumatic hysteria. The association studies of Jung and others deserve critical consideration.

3. The psychoanalytic method is surely not the only one that is of value in the treatment of hysteria, neurasthenia or obsessions. In so far as the method is connected with the detailed discussion of sexual matters and perversities, it is justly rejected by many authors.

4. Psychological treatment, as it is practiced by those who do not belong to Freud's school, accomplishes as much as sexual psychoanalysis, but it must be aided according to the particular case by general therapeutic measures applicable to functional neuroses and psychoses. (Training in work, hydro and electro-therapy, dietetics, etc., and, under certain conditions, hypnosis.)

5. The procedure of those authors who carry on a propaganda in lay journals about this method of treatment, which, at best, is not proven, and which is rejected by many, deserves emphatic disapproval.

British Association. *Anthropometric Investigation in the British Isles*. (Report of the Committee on Anthropometric Method.)

London: Royal Anthropological Institute, 1909. Pp. 57. 1 s. net.

This is a reprint from the Report of the British Association, 1908, and represents the final report of the committee that began in 1902 to elaborate a standard scheme of anthropometric investigation. The scope of the work is indicated by the titles of the seven subcommittees that undertook standardization for anatomy, physiology, psychology, environment, photography, education and "schedules." Most of these subcommittees were able to arrive at final conclusions, which are presented in definite form. It is of interest to note, however, that the subcommittee on education needs little more than a single page for its relatively indefinite recommendations, and that the psy-

chological committee was unable to report any complete or satisfactory schema, but asserts that "further investigation, extending over several years, may be necessary" before a thoroughly satisfactory plan for the securing of psychological measurements can be arrived at.

Tests of visual acuity, color-blindness, auditory acuity, tactile sensitivity (esthesiometry) and strength of grip are specified by the sub-committee on physiology.

The psychological tests call for an estimate of mental traits by school teachers in terms of a scale of five degrees of development of each trait, but the traits that are specified are all, aside from certain phases of memory and apprehension, of an indefinite type, *e. g.*, such complex and "lumpy" characteristics as "play of fancy," "power of reasoning," "freedom of emotional expression," "conscientiousness," "sociability," "masterfulness," "initiative," and the like. We fail to understand how the assembling of any amount of school-teachers' opinions on such traits will further the advancement of anthropometric investigation.

CORNELIUS HOOD.

JOSEPH GRASSET. *The Marvels Beyond Science*. Translated by René Jacques Tubenff. New York: Funk & Wagnalls, 1910. Pp. 379. \$1.75.

This translation of a French work is a unique effort to classify the so-called phenomena of the occult from the point of view of positive science. Part I is historical. Part II treats of animal magnetism and hypnotism, table-turning, the exploring pendulum, willing games, the conjuror's wand, crystal vision, hallucination and false memory, romances of mediums, etc., under the heading "The Occultism of Yesterday." Part III, entitled "The Occultism of Today," treats of theories and special cases (1) whose demonstration, if possible, appears very far away, such as telepathy, premonitions, telekenesis and materializations, and (2) whose scientific demonstration does not appear so distant, but must be at first sought for, such as mental suggestion, the direct communication of thought, levitations and clairvoyance. The book is burdened by an artificial and neural conception somewhat analagous to the brain levels of Hughlins Jackson, but the style is lucid, and, in so far as authorities can agree on this subject, the book is one of the best guides up to date. On



the whole, it will serve a good purpose in giving in simple, popular language the classification of the phenomena which have been or are at present classified as occult, and justifies the words of Emile Faguet in the introduction: "To speak as sailors do, Dr. Grasset has endeavored to 'calculate the reckoning of the ship,' and it appears that he has succeeded."

C. E. S.

JOHN B. HAWES, M.D. *Boston Educational Methods in the Anti-Tuberculosis Campaign.* Boston Medical and Surgical Journal, September, 1910. Pp. 350 f.

Dr. Hawes describes in detail methods of education with reference to the nature and treatment of tuberculosis which he has found effective for adults and for children in Massachusetts. Two groups of methods are outlined. Under the first group, viz., methods suitable for adults, are suggested (1) the tuberculosis exhibits which are sent to shops, factories, schools, etc., for the purpose of demonstrating the nature and treatment of tuberculosis; (2) press articles which are prepared by the National Tuberculosis Association or by the State Tuberculosis Commission; (3) lectures, talks and addresses to labor organizations, woman's clubs, schools and other organizations; (4) cards, placards, etc., and (5) trained nurses and social workers. Under the second group, viz., educational methods best suited for children, the following are mentioned: (1) The school nurse, (2) school tuberculosis exhibits and (3) outdoor schools. These methods have all been tried by Dr. Hawes, and have proved successful. The highest value is placed upon the tuberculosis nurse and social worker.

FRANKLIN O. SMITH.

University of Iowa.

HALBERT HAINS BRITAN. *The Philosophy of Music.* New York: Longmans, Green & Co., 1911. Pp. xiv, 252. \$1.35 net.

This is the most clean-cut contribution to the psychology of music that we have yet had in elementary and popular form. In the introduction the author gives a brief outline of the elementary facts of musical form. In the second part he discusses in turn, rhythm, melody, harmony and musical expression from the psychological point of view. And in the third part he treats of the characteristics of music, the content of music, musical criticism and the educational

value of music from the philosophical point of view. The book gives just the kind of information about the psychology of music that the elementary students of psychology and all musicians should have. It is a well-written, judicious, elementary manual, written much more from the psychological point of view than from the philosophical.

C. E. S.

JULES COMBARIEU. *Music: Its Laws and Evolution*. New York: D. Appleton & Co., 1910. Pp. 342. \$1.75.

CHARLES H. FARNSWORTH. *Education Through Music*. New York: American Book Co., 1909. Pp. 208.

HENRY FISHER. *Psychology for Music Teachers*. London: J. Curven & Sons, Ltd., 1905. Pp. 186. 3s.

ALBERT GEHRING. *The Basis of Musical Pleasure*. New York: G. P. Putnam's Sons, 1910. Pp. 202.

DAVID C. TAYLOR. *The Psychology of Singing*. New York: The Macmillan Company, 1908. Pp. 382. \$1.50.

Combarieu takes issue with such men as Helmholtz, who say that "in music, sensation is everything." He demonstrates that even after such sciences as acoustics, physiology, mathematics and psychology have done their best to define it, music is yet something far different, far more than a synthesis of all these points of view. It is a thing which comes more from within us, expressing the essential unity of things; it is, he says, "the art of thinking in sounds." The book forms a meritorious contribution to the best understanding and interpretation of music.

Farnworth points out that most people receive no formal instruction in music after leaving the elementary school. He therefore chooses to discuss the most effective way of spending the little time that is allowed. The following principles are emphasized: Some sort of musical experience should precede formal instruction; where such experience is lacking, the teacher should supply it; this experience should be so organized that while a particular effect is studied, its relation to the total effect shall not be lost; the teacher should recognize that the impulse in artistic education lies in the desire of the individual to express himself, and that education through music should quicken perception, clarify feeling and stimulate initiative for the beautiful. Appreciation of music is, according to Farns-

worth, dependent upon the appreciation of the ideas and experiences which lie back of music, and which are so often neglected by the instructor. According to the plan outlined, the first phase of the work should begin with the singing of songs and end with the learning of notation. Then the pupil should learn to unite the elements so as to form the concepts of the *mótifs* and phrases of musical passages. In the seventh and eighth grades, which is the beginning of the adolescent period, there should be more attention paid to appreciating music through listening to others, which is on the average the greater part of one's musical experience.

Fisher presents what seems to him the most practical and direct psychological information on the topics which have to do with the work of the teacher of music. A wealth of musical illustration and practical suggestion accompanies that discussion of the psychological principles. The book will surely appeal to a large circle of readers.

Gehring makes a careful search for the reasons for the mystical charm and power of music in this treatise on the nature and meaning of the musical emotion. He discusses the principal theories of musical enjoyment in a clear and critical manner, and performs valuable service by indicating the nature and relationship of the various factors of which the final theory must take account. Some of his observations, especially those relating to the structural resemblance of music and the artistic dance, are particularly enlightening.

Taylor reviews and analyses the modern methods of instruction in singing; discusses the basis of a real science of the voice, and outlines a practical method of vocal culture. The avowed purpose of this book is to demonstrate the falsity of the idea of mechanical vocal management (conscious control of all the muscles that have to do with voice production) and to prove the scientific soundness of instruction by imitation. He contends that in singing the voice is guided primarily by the ear, just as in writing the hand is guided primarily by the eye. The muscular sense may supplement hearing, but cannot be the ultimate criterion in judging the tone production.

WALTER R. MILES.

University of Iowa.

## NOTES AND NEWS.

A friend, when asked "What is the sequel to child-study?" replied, "Having children of your own." This was a palpable thrust, **THE SEQUEL** because I had quit teaching child-study when **TO CHILD-STUDY.** my first boy came. But the answer has a deeper meaning. It means looking at the child in a practical way. The sequel to child-study is child-adjustment or child-care. The one common principle underlying all current movements in child-adjustment, or child-care, is this: *Lead the child to live and grow at his natural level.* All work for the subnormal and defective child, both as to care and education, rests upon this principle. And in the education and direction of the normal child the movements which have sprung from a recognition of the individuality of the child's nature, such as the breaking up of the lock-step grading, the introduction of the individual method of study, the self-expression movement, vocational training, vocational direction and the broadening of the educational ideal, all rest upon this common principle. The social and ethical significance of this principle cannot be overestimated, for, give a boy a lesson or a lifework such that it just fits him, and is worth while, and you need not worry about failure, unhappiness or crime.

C. E. S.

On my reading-table I find, side by side, newspaper clippings recounting the charges laid at the door of our American colleges by **WHAT IS THE VALUE OF** one Mr. Crane, a Chicago manufacturer, **A COLLEGE EDUCATION?** and a small pamphlet entitled "A Plain Statement Regarding Brown University and Its Service to the Nation." Mr. Crane has for some time sought to convince his readers that a college education is worthless. Failing in that, he appears now to be trying to convince them that these institutions are hotbeds of vice and immorality.

We are perfectly well aware of the fallacy that may underlie the inference from the success of college graduates to the efficacy of their training. We know perfectly well that it is theoretically possible that men may have succeeded in life in spite of their training, rather than because of it. And we know that our American colleges (perhaps more so a generation ago than today) have tended to select their

constituents from those naturally abler and more energetic. Nevertheless, we have been impressed with some statements issued by the committee seeking to secure further endowment for Brown University, who, to justify their request for an additional million dollars, have sought to show what service that New England institution has thus far rendered to the nation. Perhaps Mr. Crane may offer some explanation of these facts: "The graduates of the University have rendered distinguished and memorable service to the country. Among them we find 20 Governors of States, 3 Secretaries of State of the United States, 70 judges of the higher National and State courts, 15 ambassadors and ministers, 70 members of Congress and hundreds of clergymen, lawyers, physicians, teachers and leaders of industry and commerce. A few of the representative graduates, who are no longer living, but who in their lifetime rendered notable service to the country are as follows: Henry Wheaton, authority on international law; Adoniram Judson, pioneer American missionary; William L. Marcy, Secretary of State of the United States; Horace Mann, foremost organizer of public education; Samuel Gridley Howe, reformer and philanthropist; Marcus Morton, Chief Justice of Massachusetts; George P. Fisher, dean of Yale Divinity School; Alexander L. Holley, introducer of the Bessemer process in America; John Hay, Secretary of State of the United States; Robert H. Thurston, director of the Sibley College of Mechanical Engineering at Cornell University"—but why continue? Is the American college a worthless and vicious institution?

We are inclined to agree with President Schurman, who, in his recent annual address to the undergraduates of Cornell, characterized Mr. Crane's allegations as "a libel and outrage on a group of the ablest, most high-minded and devoted citizens of the Republic," the college professors of our highest institutions of learning, as well as a reckless indictment of the great body of our university students.

G. M. W.

In a recent report the committee on commercial education of the New York Chamber of Commerce complains of the character of commercial education in the public schools of New **THE SCHOOLS** AND **BUSINESS.** York City. It points out that "business suffers from the lack of trained assistants, and the assistants suffer for the lack of the training which should make them useful early in life."

The recommendation is made that the Chamber take up the matter in some practical way, such as the establishment of scholarships in the schools, the recognition of certificates for proficiency in school work and the provision of opportunities for employers and employees to get in touch with each other. It is a matter for congratulation that the leading business organization of the city is taking an active interest in the work of the schools. All too often the business man has only sweeping and drastic condemnation for school work, and overlooks his responsibility to do what he can to help make the schools what he thinks they ought to be. In view of the fact that the vast majority of young people go directly from the public schools into some sort of gainful occupation, there should be the closest relation between the schools and business. This is increasingly appreciated by school people, and many schools are making definite efforts to place their pupils to the best advantage. All too often they meet with only indifferent co-operation on the part of business men. We need articulation between the schools and business, but this cannot be brought about by the schools alone. Business men must do their share, and it is gratifying to note that they are beginning to realize that fact.

J. C. B.

The special committee on health, hospitals and charities of the New York City Board of Estimate has recommended the extension of the work done by the division of child hygiene to include the establishment of municipal dental clinics, either directly in connection with the schools or in some central place to which children may be sent. The committee finds some fault with the present system of medical examination, on the ground that no provision is made for following up the cases examined and making sure that the recommendations are carried out. It is interesting to note that this is precisely the rock around which the new English medical inspection system finds difficulty in navigating. Parents, especially the poorer ones, are lax about heeding the suggestions of the medical examiner, and to what end is the examination if nothing is done for the child? It is only by careful and persistent "follow-up" work that the child can be relieved or the responsibility placed where it belongs.

The Second Annual Meeting of the American Association for Study and Prevention of Infant Mortality, Hotel La Salle, Chicago, November 16 to 18, presented a program containing many features

of interest to educators, particularly in the section meetings scheduled for Friday morning on "Eugenics" and on "Continuation Schools of Home-Making." In the former, the topics discussed were "Eugenics and Infant Mortality," by Roswell Johnson; "Heredity vs. Environment in Relation to Infant Mortality," by David Starr Jordan; "Genetics and Eugenics," by Raymond Pearl; "The Eugenic Aspect of the Alcohol Question," by Dr. J. P. Warbasse; "The Hereditary Effects of Venereal Diseases," by Dr. Prince Morrow; "Hereditary Tuberculosis," by Prof. H. E. Jordan; "Eugenical Limitations to the Prevention of Infant Mortality," by Dr. C. B. Davenport. In the latter section an attempt was made to outline a course for continuation schools of home-making, with special reference to the needs of girls who leave school before the age of 16.

President Faunce, in his annual report to the Corporation of Brown University, says: "It may well be considered whether our service to the State will not require at no distant day the establishment of a School of Education. \* \* \* A year or two of graduate work in the study of education, in strictly professional training to fit teachers for their responsible task, might cover ground not now occupied in New England, and prove of greatest service to Rhode Island." Brown has enjoyed for many years a flourishing department of pedagogy under the leadership of Prof. W. B. Jacobs, and has developed profitable affiliations with the public schools of Providence. If the proposed School of Education were established as a strictly graduate school, it would, indeed, be an interesting innovation. We believe it would be a step in the right direction.

The Francis Galton Laboratory Committee has issued an appeal for contributions to the sum of \$75,000 to build the Galton Laboratory for Eugenics. It will be remembered that Sir Francis Galton left the residue of his estate, some \$225,000, to the University of London for the purpose of encouraging the study of national eugenics, but that he expressed the hope that this sum might be kept intact and not encroached upon for the cost of buildings, etc. The university desires to respect his wishes, and hopes to raise by subscription the amount required for housing the laboratory. The committee point out the importance of this work for the solution of social problems, and state that they are "at present in possession of material, received from educational and health authorities in all parts of the

country, which alone would afford three or four years of continuous labor for the existing staff, and the bulk of which has direct bearing upon the most important social and national problems of the day."

The issue of the *Teachers' Guild Quarterly* (London) for October 16, 1911, contains an account of the discussion at the Worcester Conference of the question, "What can the psychologist do for the teacher?" by Prof. J. A. Green of Sheffield and Mr. W. H. Winch of London. Professor Green considers that the relation of the teacher to the psychologist is like that of the farmer to the chemist. He repudiates Welton's statement that "every true educator is always making use of real psychology" on account of the ambiguity of the term "real psychologist." In such a sense we may say that the man who digests a good dinner is making use of real chemistry, though he may be as ignorant as a child of the science of chemistry. The good teacher is not necessarily a psychologist. Perhaps the chief things that the teacher can get from the psychologist are an appreciation of the amount and importance of individual differences and the correlation of his experiences to prevent him from being the victim of fashion and fad. Mr. Winch is inclined to question the extent to which the *applications* of psychology may be valuable for the teacher. It is doubtful to what extent the results of pure experimental psychology can be *applied* to schoolroom situations. He would lay greater emphasis on the new science of experimental pedagogy, insisting that education has its own problems which must be experimentally studied in their setting by methods worked out from actual school conditions. From such a science, still in its infancy, the teacher would get help at every turn. Mr. Winch discussed in detail the value of experimental studies in settling questions of method and of school administration.

The American Psychological Association will meet in Washington, D. C., December 27, 28 and 29. One session will be devoted to a symposium on "Instinct and Intelligence." There will be separate sections on Animal Behavior, Educational Psychology, Experimental Research and Psychology in Its Relation to Medical Education. There will also be a session for brief reports on current research and exhibition of apparatus.

It is with keen appreciation of the loss suffered by educational



psychology that we chronicle the death on October 18 of Prof. Alfred Binet, director of the psychological laboratory at the Sorbonne, Paris. Professor Binet was born at Nice in 1857. Like Professor William James, his early training was in the field of medicine. He studied at Paris, and was a pupil and assistant of the great Charcot at the Saltpetrière Hospital. In 1894 he was made director of the laboratory of physiological psychology at the Sorbonne, a position which he held until his death. In 1895 he founded, with the collaboration of M. Beaunis, the *Année Psychologique*, which, since 1897, has been continued under Binet's sole direction. In 1900 he was the leader in founding the *Société libre pour l'étude psychologique de l'enfant*, of which he has been president since its foundation. Through the *Année Psychologique* and his many books he had come to be the acknowledged leader of experimental psychology in France, and wielded a powerful influence in the application of experimental methods to educational problems. He is perhaps most widely known in this country for his "Measuring Scale of Intelligence," which is receiving increasing and well-merited attention.

We note the death on October 7, at the age of 76 years, of Dr. J. Hughlings-Jackson, the eminent English neurologist, well known to psychologists for his "Three Level Theory" of psycho-neural action.

Prof. C. E. Seashore of the University of Iowa delivered addresses before the Kansas State Teachers' Association and the Iowa State Teachers' Association in the second week of November.

The University of Utah has this year established a separate department of psychology, and the new chair thus created has been accepted by Joseph Peterson, Ph.D. (Chicago, 1907.)—*Journ. Phil. Psych. and Sci. Meth.*

Mr. O. F. Field has been appointed instructor in physical education at the University of Missouri.

Mabel Irene Jenkins, for some years a teacher in the Willimantic Normal School, has been appointed assistant in practice teaching in the department of education at Wellesley College. Miss Jenkins' work will have especial reference to graduate students who are qualifying for high-school positions. Dr. John Franklin Brown remains lecturer in the same department.

## PUBLICATIONS RECEIVED TO NOVEMBER 1, 1911.

(Notice in this section does not preclude a more extended review.)

S. S. COLVIN. *The Learning Process*. New York: The Macmillan Company, 1911. Pp. xxvi, 336. \$1.25.

A comprehensive textbook covering the field of educational psychology, and exceptionally well adapted to university classes, to advanced normal-school classes and to groups of teachers who wish to study a well-informed and scholarly book under competent leadership. From the technical point of view, there are many phases of the treatment that are new and will undoubtedly arouse discussion. A more extended review will appear in a later number of the JOURNAL.

J. W. GARNER. *Government in the United States*. New York: American Book Co., 1911. Pp. 416.

An unusually good text for high-school classes.

WALTER ALBERT JESSUP, PH.D. *The Social Factors Affecting Special Supervision in the Public Schools of the United States*. New York: Teachers College, Columbia University, 1911. Pp. 123. \$1.

A study in educational sociology, in which the author traces the history of the introduction into the school curriculum of the so-called special subjects, as music, drawing, manual training, domestic science, physical education and penmanship, points out the social sanctions of these subjects and discusses the conditions which gave rise to their special supervision.

GEORGE TRUMBULL LADD AND ROBERT SESSIONS WOODWORTH. *Elements of Physiological Psychology*. Revised and rewritten. New York: Charles Scribner's Sons, 1911. Pp. xix, 704. \$4 net.

The aim of this book, as the title indicates, is to give an account of mental life in its relation to bodily functioning. The tremendous advances made by physiology and neurology during the past 25 years, and the increasing tendency to regard psychology as a science of behavior, have created a demand for a detailed discussion of the interrelations of mind and body such as this work presents. Part I, dealing with The Nervous Mechanism, contains almost 300 pages,

and gives an excellent portrayal of the development and structure of the nervous system, the sense organs or receptors and the localization of function in the cortex. Part II, *Correlations of the Nervous Mechanism and Mental Phenomena*, presents the results of recent physiological investigations, and Part III discusses the Nature of the Mind.

PAUL MONROE, Editor. *Cyclopedia of Education*. Vol. II. Church-Fusion. New York: The Macmillan Company, 1911. Pp. xi, 726. \$5 net.

The high standard of scholarship and scientific accuracy established in the first volume of this work is ably maintained in the present volume. Among the longer articles which are of especial interest to educational psychologists are the education of the deaf-blind, by Annie Sullivan Macy, the teacher of Helen Keller; the ear, hearing and tests of hearing; defectives; eugenics; evolution; experimental pedagogy and experimental schools; the eye and eye-mindedness; fatigue, and formal discipline.

EUGENIO RIGNANO. *Upon the Inheritance of Acquired Characters*. Authorized English translation by B. C. H. Harvey. Chicago: Open Court Publishing Co., 1911. Pp. 413. \$2.

Rignano is not primarily a biologist; he is an engineer and a physicist. He suggests an interesting, although far from convincing, hypothesis, which, he thinks, will justify a belief in the transmission of modifications.

DR. L. SCHOLZ. *Anomale Kinder*. Berlin: S. Karger, 1911. Pp. vi, 442. M.10.

A very general discussion of the causes, types and methods of treatment of abnormal children. The book is intended for the educated layman who may be interested, or whose interest may be aroused, in the philanthropic care for these unfortunates. The medical point of view is emphasized throughout, and in the tests of intelligence there is little beyond the procedure of common sense. The Ebbinghaus completion test is referred to, but there is no mention of the Binet tests. Indeed, like many other German writers, the author does not seem to have emancipated himself from the provincialism of thinking that nowhere else but in Germany are these matters being investigated.

H. H. SCHROEDER. *The Psychology of Conduct Applied to the Problems of Moral Education in the Public Schools*. Chicago: Row, Peterson & Co., 1911. Pp. 228. \$1.25.

Why this book is called a *psychology* of conduct is not easy to discover. One finds precious little psychology in it, or anything else

than some common-sense moralizings about social relations. These will perhaps be practical and helpful for the young teacher.

F. SCHUMANN. *Bericht über dem IVten. Kongress für experimentelle Psychologie in Innsbruck, 19-22 April, 1910.* Leipzig: J. A. Barth, 1911. Pp. xxviii, 312. M.11.

This excellent report presents an interesting and valuable cross section of contemporary movements in German psychology. Of especial importance are the articles of von Monakow: On the Development and Localization of Movements in Man; M. Geiger: On the Nature and Significance of "Einfühlung"; P. Ranschburg: Results of the Experimental Psychopathology of Memory; K. Marbe: On Thought Reading and the Uniformity of Psychic Activity; O. Lipmann: Visual Observational Types; J. Cohn: Investigations on Sex and Age Differences in Children, and K. Bühler: A Method for the Investigation of Memory for Space Relations.

HENRY H. P. SEVERIN AND HARRY C. SEVERIN. *An Experimental Study on the Death-Feigning of Belostoma (=Zaitha Auct.) flumineum Say and Nepa apiculata Uhler.* Behavior Monographs, Vol. I, No. 3, 1911. New York: Henry Holt & Co. Pp. iii, 47. 65 cents.

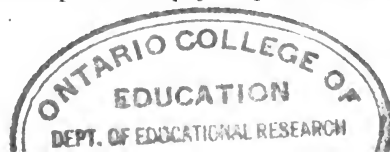
A painstaking study of this remarkable self-preservative instinct. After a series of 38 death feints the animals would not respond until placed in water. After continuous successive feints lasting eight hours on an average, the animals refused to feign under any conditions. It would be interesting to know whether this modification of the instinct left any permanent effects.

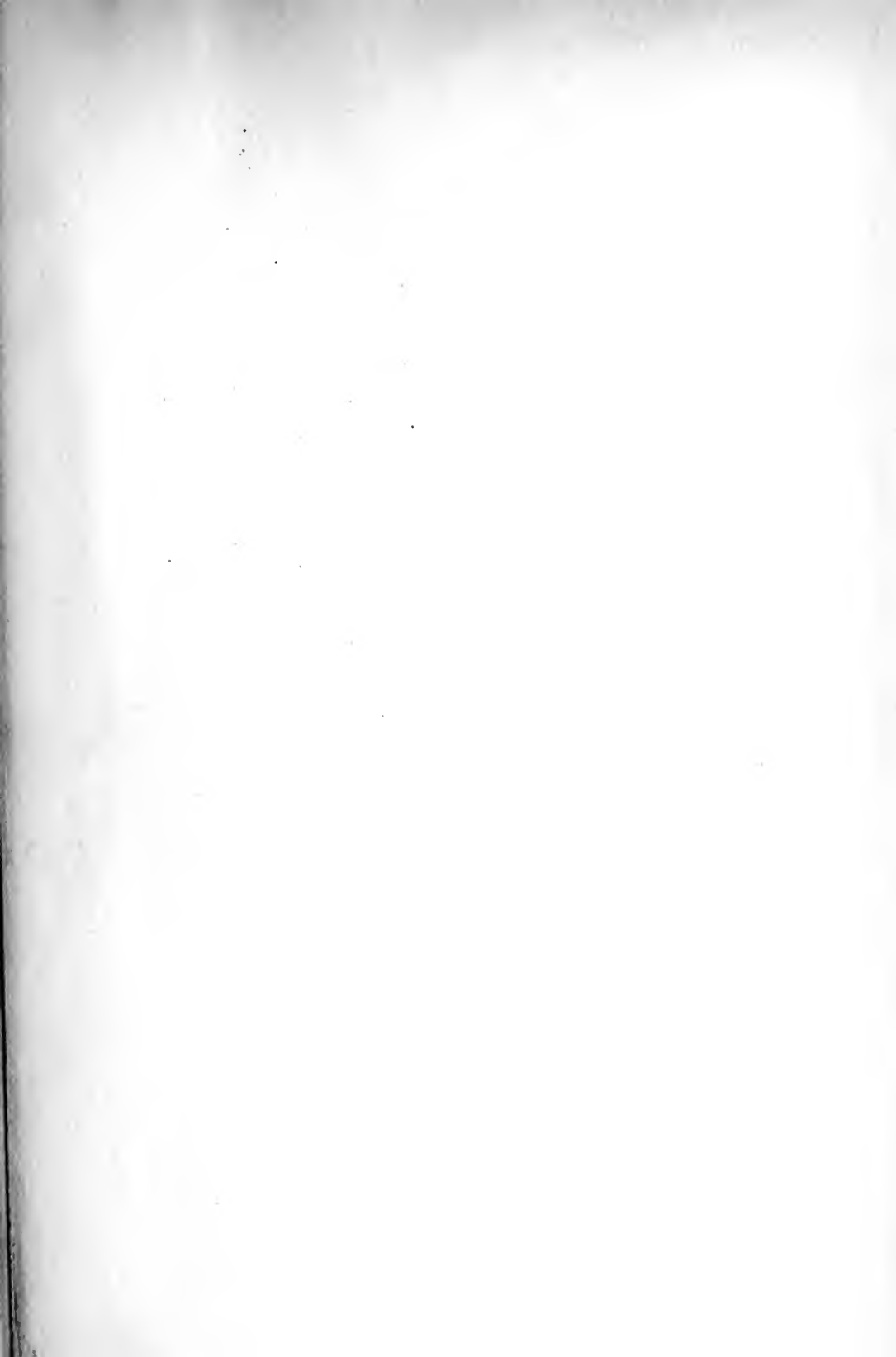
ARTHUR WRESCHNER. *Das Gedächtnis im Lichte des Experiments.* Zweite vermehrte Auflage. Zürich: Orell Füssli, 1910. Pp. 77. M.1.20.

This little book is the outcome of a series of articles on memory that appeared originally in the *Swiss Teachers' Journal*. It is one of the best brief accounts of experimental work on memory to be found in any language.

TH. ZIEHEN. *Die Erkennung der psychopathischen Konstitutionen (krankhaften seelischen Veranlagungen) und die öffentliche Fürsorge für psychopathisch veranlagte Kinder.* Berlin: S. Karger, 1912. Pp. 34. Pf. 80.

Professor Ziehen presents the histories of a number of cases of psychopathic constitution, shows clearly the outcome of this native weakness if the subject is allowed to shift for himself, and pleads for funds to complete the psychopathic home in Berlin.













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